

Original Articles.

EXTRACTION OF CATARACT IN THE CAPSULE.

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IN this article I wish to bring before the profession the operation for extraction of the lens in its capsule. If the operation can be shown to have no serious drawback, it is evident that it has many advantages over the ordinary method.

The statistical table below shows the results respectively of the operation for extraction in the capsule and for extraction by the old method of scratching the capsule, and leaving it behind. The statistical table also shows relatively the important complications and sequences to which each operation is liable. Those complications and sequences I shall deal with in this article

knife). I take a good hold of the conjunctiva in the lower segment. In case I intend to do no iridectomy, I run the knife right across the centre of the pupil at the sclero-corneal junction just so deep as anatomy and experience teach us will avoid wounding the blood-vessels of the dangerous area and cut out with a crescentic sweep so as to finish my incision a little above the margin of a normal pupil. I would here point out that the Græfe knife should be passed through well to the heel. If done so with a sharp knife, there is no occasion for a back and forward saw-movement to complete the incision. The practised hand will, if the knife is pushed well to the heel, complete his incision by drawing it back and cutting out at the same time. I would here also point out what I consider important to beginners: text-books usually tell us that the first step is to pass the knife through, and then to cut out. The beginner generally finds that the iris drops across the edge of his knife after he has passed it through. Later on in his experience he finds that the accident seldom occurs.

Cataract Extractions in Jullundur Civil Hospital from June 1st, 1899, till May 1st, 1900.

	Numbers.	Prolapse of Iris.	Iritis.	Escape of Vitreous.	Capsule giving way during operation.
Extraction of lens in capsule without iridectomy.	692	7 or 1.01p.c.	4 or 0.6p.c.	*96 or 14p.c.	88 or 11.4p.c.
Extraction of lens in capsule with iridectomy.	78	2 or 2.5p.c.	1 or 1.3p.c.		
Total No. of extraction of lenses in capsule ...	770	9 or 1.16p.c.	5 or .65p.c.	*96 or 14p.c.	88 or 11.4p.c.
Extraction with scratching of capsule ...	1,034	16 or 1.5	14 or 1.3	85 or 8.4p.c.	
Total number of cataract extraction.	1,804				

RESULTS—

1st Class eyes 95.5p.c.
2nd Class eyes 2.0p.c.
Failures 2.5p.c.

* Twelve cases of voluntary evacuation of vitreous to prevent prolapse reduce percentage to 10.8 of involuntary escapes. These are included in the ninety-six cases.

later on. The statistics in the table represent the cataract extractions in this hospital from the 1st of June 1899 to the 1st of May 1900, i.e., for eleven months only. The groups in the table were not selected for any operation by taking the favourable cases for one operation and leaving the unfavourable cases for another. Each group represents the cases done in a particular season as a whole, with the exception of a few cases which I shall deal with later on under the head of Complications.

The following is a detailed description of the operation I perform for extraction in the capsule. Assume that the case is a favourable one for operation, and that all aseptic preliminaries have been gone through, the eye being cocaineized, I insert a weak spring speculum (a speculum with the ingenious screw mechanism is not necessary and is too much in the way of our

The accident is due to following, consciously or unconsciously, the instructions concerning the first and second steps just mentioned.—The incision should be made in one step; if the driving of the knife through and the cutting out be one and continuous, the accident referred to will very seldom occur. The eye after the incision is washed out with 1 in 3,000 mercury bichloride solution. The speculum is taken out, the upper eyelid is hooked up on an ordinary ophthalmic blunt hook by an assistant, who draws down the lower lid by the usual method of placing the face of the thumb on the skin of the face close to the eyelid and drawing it down. He lifts the upper lid well up with the blunt hook, and relaxes neither the upper nor the lower lid till the operation is finished. Concerning the use of the blunt hook in this connection, it is important that he should keep the

upper lid well lifted up. In the ordinary operation for cataract, every one knows that if the speculum is lifted up by the assistant, he can take the pressure off the eye and lessen the tension. This is easily seen after making the incision. With the blunt hook we can control almost absolutely any effort on the part of the patient to squeeze out vitreous. The power of the speculum so used is not sufficient to control the contraction of the orbicularis muscle, and in this operation, if we use the speculum, we must take it out after the incision is made. We are almost certain to have an escape of vitreous if we let it stand till the lens in its capsule is out. If we do not use a blunt hook or some such instrument, we must do without any retractor or speculum on account of the liability to escape of vitreous. What causes the escape of vitreous is the contraction of the orbicularis muscle when the patient winces from nervousness or otherwise. It is not the contraction of the muscles which act on the eyeball proper. This can be demonstrated on the living subject; if after the corneal incision is made, the speculum be taken out and the lids be drawn off the eyeball as above described, the tension on the eyeball will be seen to come and go, as we relax the tension on the lids or the reverse. I am aware that some people extract the lens in its capsule without either speculum, blunt hook or retractor. In my experience such a method, leaving the orbicularis muscle too free to act, is unpleasantly often associated with an escape of vitreous. To come back to our subject; I now place the convexity of a blunt hook just over the junction of the lower with the middle third of the lens and a spoon above my incision to make counter-pressure. I now press the blunt hook down neither towards the wound nor from it, and do not alter its position till the lens is nearly out, all the time making slow steady and uninterrupted pressure and counter-pressure. When the lens is about two-thirds out, if it seems reluctant to easily come further, I keep up the pressure with the spoon in its original position and shift my blunt hook forward and gently tilt the lens by setting the edge of it in the concavity of the hook. If this manoeuvre be done with the spoon or other comparatively sharp-edged instrument or with the slightest roughness or jerk, the capsule will give way and lead to a difficulty with which I shall deal later on. If it has no reluctance to come out, I push my instruments cautiously until it is delivered. In expressing the lens in its capsule without an iridectomy atropine is not necessary; I merely use cocaine, but whether with or without an iridectomy, the pressure must be slow, steady and uninterrupted—no jerks and no shifting of instruments. This slow, steady strain of the lens on the iris allows time for the pupil to

dilate, the muscle of the iris gently relaxing when it gets tired. It also allows time for the lens to become gently dislocated. The operator, who attempts to express the lens in its capsule as rapidly as in an ordinary extraction in which the capsule has been scratched, will have disastrous results. By over-rapid expression, the capsule when more than half way out will very often give way and retract with some lens matter. In this case it will be difficult to get out the capsule and lens matter. The lens being extracted, and if vitreous has made its appearance, it being snipped off, and the iris, if prolapsed, being replaced with the end of the blunt hook, a drop of atropine is instilled, and the lids are let go by the assistant, some iodoform is powdered on the fissure of the eyelids, and an antiseptic pad is put on with a figure-of-eight bandage.

It will be observed that the assistant holds the lids open—the lower with his thumb, the upper with a blunt hook—until the operation is finished. It will also be observed that after the lens comes out there is no washing or sponging. After the lens in its capsule comes out if we go “fiddling,” we are certain to have an escape of vitreous. The lids on closing are quite sufficient to drive any fluid there may be, whether vitreous or other, out of the conjunctival sac. I here except blood clot. Blood should never escape in a cataract operation beyond the merest trace. If it does escape, it is due either to making the incision into the dangerous area or to an iridectomy wound in a glaucomatous eye or to a cornea which is vascular, or to the conjunctiva, on the inner side, getting up over the point of the knife and getting wounded while passing it. In the instance of the glaucomatous eye just mentioned, the glaucoma is too far advanced for operation if the iris bleeds when cut. In the case of vascular cornea just mentioned the operation should not be done till the cornea gets into a better condition. In case of the conjunctiva gathering over the point of the knife the assistant should shove it back with a spoon to save it from being wounded.

The operation for extraction in the capsule with an iridectomy differs in no way from the above except that the line of incision keeps in line with the sclero-corneal junction, entering at it and ending just in the cornea and including fully a third of its circumference. The conjunctival flap spoken of so highly by some operators I have tried liberally, and am now satisfied that it has no advantage, but has the disadvantage of bleeding during the operation.

The corneal wound in any form of cataract operation should be sufficiently large to let out the lens without any difficulty. I have never regretted having made the wound so large as to

let out the lens easily, and I have never seen evil consequences from such. I have always regretted having made the wound so small that the lens was a tight fit; when made too small it is exceedingly difficult to enlarge it. An easy wound for extraction in the capsule is of much more importance than in cases in which we scratch the capsule. When the capsule is scratched, we intend to leave it behind as a rule; when it is not scratched, we intend to take it out.

Capsule giving way.—If the incision be too small, the capsule is certain to give way and to retract with some lens matter, letting the lens core escape; we have then to deal with the most serious complication of this form of operation. The capsule is dislocated in part. If we try too much coaxing to get out the trace of lens matter we will succeed in mixing it up with the vitreous, from which we may expect serious consequences. Our best plan, if the capsule gives way, is to not relax but to keep up such pressure with the blunt hook as will not allow it to retract, and with the left hand to lay down the spoon with which we are making counter-pressure and to take up an ordinary dissecting forceps and to pull out the capsule which is hanging out of the wound, which will also fetch out with it the contained lens matter. The practised hand will seldom fail in this manoeuvre. But if, after the capsule bursts, we take off for an instant all pressure on the eyeball, the capsule will almost certainly retract within the wound. If it retracts within the wound, we should try a little gentle coaxing to get out the lens matter, but be careful not to mix it up with the vitreous. Here we must remember that the capsule is in part dislocated. We may then try once or twice with an iris forceps to catch the capsule and fetch it out. If we fail in one or two attempts we should desist and watch events. This capsule, if left, will certainly become opaque as its nutrition is in part destroyed. We can after a fortnight do an iridectomy, pass an iris forceps through the wound and fetch out the opaque capsule. If lens matter be left in any operation, it is very likely to set up iritis. In fact, in my experience, iritis following cataract extraction by any operation is due almost invariably to lens matter left behind, assuming that no curette or other instrument has been introduced into the eye after the lens has escaped. If lens matter is mixed up with vitreous, the result is inflammation of the vitreous and loss of the use of the eye. Knowing these facts we take every precaution against them occurring. When the lens in the capsule is extracted, my observation is that iritis hardly ever occurs.

Escape of vitreous, so much dreaded by the novice, though not a desirable thing, I have very seldom seen evil consequences from. Cases in

which there has been an escape of vitreous appear to do just as well as other cases if the escape does not exceed a third.*

In any form of cataract extraction curetting or other methods of extracting lens matter by the introduction of instruments into the eye should under almost no circumstances be adopted. The iris is very sensitive to being touched with such instruments, and the posterior epithelium of the cornea does not admit of being touched with such instruments without being followed by inflammation. The outer surface of the cornea stands with impunity considerable manipulation, and the experienced hand can almost, if not always, coax out by external manipulation the whole of the lens matter even in immature cataracts, if the capsule has not been dislocated. In the latter class of cataracts (immature), on which one rarely, though occasionally, operates, we may take them out in the capsule or scratch. To take them out in the capsule I prefer, as there is no doubt about lens matter being left behind in this case. If we scratch the capsule we simply manipulate until a little time after the last trace of transparent lens matter has ceased to appear at the wound; it being transparent we cannot see it in the eye and must depend on our manipulation. I have operated on a few of this variety in very slowly ripening cataracts with just as good results as in ripe cataracts, and I consider that the artificial ripening of such cataracts is unnecessary, if the manipulator be experienced.

A complication which occasionally occurs in extraction of lens in the capsule is the appearance of a little vitreous behind the lens when it is half way out. In this case, if we go on pressing it out we will fail in our object, but succeed in pressing out the vitreous. When vitreous in this way begins to make its appearance, we should keep up such pressure with the blunt hook in our right hand as will keep the lens in position, and pass the spoon with which we are making counterpressure into the opening where the vitreous is appearing and lift out the lens on it. It is a simple and satisfactory proceeding. Of the ninety-six cases of escape of vitreous under extraction in the capsule in the statistical table, I include the slightest case of escape. Of the ninety-six cases just referred to,

* A well-known ophthalmic surgeon in this Province has given me the following note which is of considerable interest on escape of vitreous:—The strength of vision of A. B., who was operated on for cataract on both eyes under chloroform in 1883, is with a *plus* 11D. lens for each eye 15 feet type at 11 feet with the right eye, at 10 feet with the left eye, at 13 to 14 feet with both eyes. At the time of operation on his right eye he had a violent fit of coughing, which led to a large escape of vitreous, and as it was considered that he had little or no prospect of vision in that eye from the extensive nature of the escape, the left eye was operated on at the same time. It is now 17 years since the operation was performed, and he is now 75 years of age.

in twelve I evacuated intentionally a few drops of vitreous by way of experiment which reduces the accidental escapes to 10·8 p. c. By experience, we know, that a slight escape of vitreous, when the lens and capsule are out, is of no importance. I have frequently observed that cases, in which there has been an escape of vitreous, are not complicated with prolapse of iris. The cause of prolapse of iris, in my opinion, assuming that the corneal incision has been properly made, in the vast majority of cases is due to the pressure of the vitreous bagging out the iris. The twelve cases just mentioned are cases in which the vitreous, at the time of operation, was bagging out the iris into the wound, and would have been certain to have retained it there with the usual consequences. The usual procedure in such cases is to do an iridectomy. Knowing the harmlessness of a slight escape of vitreous I snipped a small section of it in those twelve cases, and expressed a few drops of it sufficient to allow the iris to fall back. The result was all that could be desired. I am fully aware that many will consider this a very heterodox proceeding; however I invite attention to it, as I consider, it will some day take the place of an iridectomy under such circumstances. I have often been disappointed with the result of an iridectomy; in such cases, as I have often seen, when the iris has been cut off at the time of operation the vitreous still keep up such pressure as to itself prolapse into the wound and prevent union, having to be afterwards snipped, which I consider a more serious complication than a prolapse of iris. In the case of prolapse of iris, it becomes adherent to the cornea and shuts off the interior of the eye. In the case of prolapse of vitreous, an iridectomy having been done, it does not become adherent to the cornea, with the result that the eye is more liable to be invaded by pyogenic germs, and the vitreous itself to become inflamed.

With regard to the class of cataracts whose capsule is likely to burst when nearly out, leading to the complication abovementioned, it might be of interest to your readers to know my experience (this is the exception which I mentioned in the early part of this article as regards the groups). I know no way of diagnosing cases in which the capsule will give way with certainty. A certain proportion of cases I am unable to diagnose until the accident occurs. In a large proportion of cases I am able to diagnose. In these latter cases the lens has the colour of a mixture of one-third water and two-thirds British skim-milk. I cannot describe it more accurately. In such cases I scratch the capsule and leave it behind.

Couched lenses.—Under the head of extraction in the capsule in the statistical table is included 31 cases of extraction of lenses couched by the 'rawal' or pioneer of cataract operators. In many

instances of couching the operation is not perfectly done, and the lens floats up again so as to obstruct the pupil in part or entirely. In many of these cases the lens is only partially dislocated, a hinge being left, on which it floats back again in front of the pupil. In such cases, when the patient comes to me while his eye is otherwise healthy I unhesitatingly extract the lens and have never regretted it. We diagnose the soundness of such eyes by the condition of the iris, the reaction of the pupil to light and the capacity in the patient of distinguishing light from darkness. In these cases we have carefully to diagnose, if possible, if there is the hinge above mentioned. If there is, we must make our incision in the opposite segment of the eye, as if we make the incision at the hinge, the lens may fall back, and we may have great difficulty in getting it forward. If we make our incision in such cases on the opposite segment such a lens will generally float up into the pupil. In the extraction of couched lenses it is advisable to always do an iridectomy as we have often to pass in a spoon to lift it out. We find that many such cases are easily expressed without escape of vitreous and without the introduction of a spoon just as if no couching had taken place. In case the vitreous does not make its appearance in these cases before the escape of the lens, expressing them is a very simple matter, as the lens is already dislocated and is generally partially absorbed. In the hinged variety it is different. In them vitreous very often makes its appearance before the lens, and we are obliged to insert a spoon to lift it out. I have never yet failed to extract a couched lens, and such cases do just as well as other sound eyes.

I now propose to deal with a few points of general interest.

Soft Cataracts.—I think it is not sufficiently recognized that there are, apart from the condition of the capsule, two varieties of soft cataract in children. By treatises on ophthalmic surgery we are left to infer that every cataract in a child is of a milky consistency within the capsule. Experience teaches us that this is not so; we often do meet with this variety, but we often meet with soft cataracts in children, in which the substance within the capsule is of a semi-gelatinous consistency with a slight tendency to be stringy. The experienced eye can at once tell which is which; the one with the milky juice is of a skim-milk colour and uniform in colour, whereas the semi-gelatinous one is white, and on close inspection is not absolutely uniform in colour. To be able to make the distinction is very important, as far as the patient is concerned and as far as treatment is concerned. The orthodox method of needling the cataract with the milky juice is very satisfactory; the semi-gelatinous variety should not be needled at all. If needled it will

not be absorbed; if needled the lens matter let loose in the aqueous chamber is very likely to set up an iritis, a thing which does not occur in the variety with the milky juice. The semi-gelatinous variety should invariably be extracted. I now personally extract all soft cataracts. To extract them is as simple as to needle them. In extracting such cataracts it is sufficient to make a wound the size we are accustomed to do for an iridectomy, and to scratch the capsule and to drive out the whole of the lens matter—a proceeding which is eminently satisfactory.

With regard to the semi-gelatinous variety above referred to, I may mention a case which shows plainly that the distinction in diagnosis and in treatment, to which I have just referred, is at least outside India not recognized. *Case*, a child four years of age, a soft cataract in each eye, congenital, was brought to one of the leading ophthalmic surgeons in Europe. (The child was not brought to any ophthalmic operator in this country further than for consultation.) Each eye was needled ten times about five years ago; the result is that the semi-gelatinous lens matter has not been absorbed in the slightest degree, and the child's vision is not improved. In the early part of my experience, I needled a few such lenses, but took care to make a small incision and extract the lens matter before the patient left hospital.

Cataracts in albinos.—I have extracted three lenses in albinos apparently with as good results as in normal eyes.

Cataract in microphthalmic eyes.—I have extracted two congenital cataracts in a child with microphthalmic eyes. The capsules which were opaque I pulled out with an iris forceps; the result was as satisfactory as we could expect in eyes with such imperfectly developed *fundi*.

Cataract in cases in which the iris is adherent all round to the lens.—There appears to be some doubt as to the advisability of extracting such cataracts at all. My opinion, based on the experience of a few cases, is that they should be extracted. The first difficulty is in the diagnosis, the pupil cannot dilate with atropine, nor react to light. We must be guided by the tension of the eyeball, the appearance of the lens, the appearance of the iris and the capacity of the patient to distinguish light from darkness. If from these facts we come to the conclusion that the eye is otherwise sound, we should not hesitate on account of the adhesion of the iris to the lens. In such cases we should, after making our incision, do an iridectomy and extract the lens in the capsule, as the capsule is in such cases rough and opaque.

Cataract in diabetics.—I have extracted seven cataracts in diabetics without a single failure.

Cataract in chronic Brights disease.—I have extracted eleven cataracts in chronic Brights disease without a single failure.

To sum up the advantages of extraction in the capsule.—It is as simple as the ordinary operation in experienced hands. It has the great advantage of leaving nothing behind to become opaque, and no foreign matter to set up iritis. No instruments require to be inserted in the eye after the delivery of the lens. Its drawback as compared with the ordinary operation is a little greater liability to escape of vitreous, which I have above shown to occur in a little over 10 p.c. of the cases, which is 2 p.c. more than in the ordinary operation.

With regard to the results shown in the statistical table, I may here say that in such a large amount of ophthalmic surgery we come across three classes of cases. *First*, perfectly sound eyes, except for the presence of cataracts; *second*, eyes so unsound that we reject them without hesitation; and *third*, eyes of a doubtful nature. In this latter variety we occasionally operate, taking care in our selection. The patient tells us that he is blind, and asks us to let him have a chance if we think there is any prospect. We have often very satisfactory results in these cases, though most of our failures are in this group. If I were operating with a view to showing good results in the form of statistics, I would reject this category. Excluding this category, I may here say that I agree with Colonel Geoffry Hall, I.M.S., where he says that eyes going wrong after cataract extraction "can nearly always be traced to something which went wrong at the operation," and also where he says, "the more cataract operations one performs the more one is impressed with the fact that one improves as one goes on, and yet I might almost say perfection is never reached."

We often hear the common expression emanating from ophthalmic surgeons in Europe: "Oh! but you in India do not follow up your cases." The presumption which naturally follows is that European ophthalmic surgeons do follow up their cases, and that without following up cases results can be of no scientific value, however great your experience. The same sort of thing used to be said of Indian operators on stone in the bladder, but that matter has been laid at rest. For men in Europe to follow up their cases is an easy matter; they are ophthalmic surgeons, pure and simple, and are dealing with small numbers. The civil surgeons in India are different; hospital work is but a section of our duty, and our hospital work includes the whole range of general surgery. Besides, the accusation, if I may call it so, does not represent the facts fairly. The cases which go wrong are certain to confront us much oftener than we care for; the cases which go right do not come back to report progress unless they want their other eye operated on; but when we go round inspecting vaccination, we are pretty certain to see all

the cases we have ever operated on in these villages. The people are grateful and voluntarily come to greet us. Our experience thus acquired is that cataract operation cases which leave hospital right remain so.

Of the 1,804 cataracts operated on in this hospital from the 1st June 1899 to the 1st of May 1900, I did 1,571 myself, my Assistant Surgeon, Pundit Atar Chand, did the remaining 233, and I feel I cannot close this article without expressing my thanks to him for the care, skill and judgment he showed in the after-treatment of those cases.

PRECIS OF BONE OPERATIONS IN THE KASHMIR MISSION HOSPITAL WITH CLINICAL NOTES.

By ARTHUR NEVE, F.R.C.S.E.

In reviewing our bone surgery of the past ten years, we cannot chronicle the application of any great discovery, or new method of treatment. So far as better results have been attained it is by means of the careful application of anti-septic surgery, with greater discrimination in the details of surgical procedure.

The discovery of the Röntgen rays, valuable as it is for military surgery, does not promise much in the treatment of inflammatory bone diseases; as necrosed cannot be thus differentiated from healthy bone.

Table of operations, in 10 years, 1890 to 1899.

	Cured.	Improved.	Not improved.	Left hospital	Died.	Total.
Periostotomy	50	4		1		55
Linear osteotomy	203	12				215
Drilling	41	8		1		50
Trephining	..	2		..	..	2
Evacuation of Periosteal or Epiphyseal Abscess	51	4			1	56
Of Chronic bone abscess	31	1				32
Sequesterotomy or—						
Resection, etc. of—						
Upper jaw	25	1	..			26
Lower jaw	67	4				71
Other bones of head	29	4				33
Clavicle	1	2		1	..	5
Scapula	5	..				5
Humerus	52	1			..	53
Radius	25	1				26
Ulna	29	1	1		..	31
Carpus and metacarpus	19	1				20
Phalanges	105	2	..	1		108
Sternum	3	..				3
Ribs	9					9
Spine	1	2		1		4
Sacrum	1	1				2
Ilium	11	3				14
Femur	116	28	..		1	145
Patella	3	1				4
Tibia	365	9	3	4	1	382
Fibula	26	2				28
Os calcis	45	1	2			48
Other tarsal and metatarsal	37	6	1	2		46
Other unclassified bone operations	12	3		1		15
TOTAL	1,362	104	7	12	3	1,488

The tabulated operations may be broadly classified into

(a) those for *relief of tension*, whether periosteal or osseous; and

(b) those for removal of diseased products.

This second-class is a miscellaneous one, and includes its removal of tubercular foci, or gummatous deposits, as well as of carious bone or sequestra.

The bone diseases we meet with might be all classed under the head *inflammatory*, and sub-divided into

(1) the *constitutional*, such as syphilitic or tubercular;

(2) the *indirectly septic*, i.e., those due to organism carried by the blood, as in acute osteo-myelitis, or after small pox;

(3) the *directly septic*, i.e., due to organism introduced by traumatism.

It will be more convenient before dealing with the operation regionally to speak of them from this ætiological standpoint.

Syphilitic disease of the bones manifests itself (1) in children, by chronic osteitis, leading to hypertrophy. The bone may be increased in length, or in girth; and the disease is often symmetrical affecting especially the tibia and the ulna; occasionally the femur or humerus. If there be constant pain, linear osteotomy is the promptest remedy. This simply consists in an incision about two inches in length through the most tender part of the periosteum, then carried with a Hey's saw to a depth of about half an inch into the bone.

Not infrequently there are painful nodes, which occur simultaneously upon several bones.

Case I.—Boy, æt. twelve, two raised elastic and painful areas on left tibia, another on right, of five months' duration.

Dr. E. F. Neve cut down upon these, scraped, applied iodoform, and stitched up. The pain was at once relieved, and uneventful healing followed. He was eighteen days in hospital.

There may be great hypertrophy with sclerosis of bone, as in the following:—

Case II.—Girl, æt. fourteen, enormous enlargement of tibia, with sinuses leading to bare bone, of eight months' duration. In this case the anterior three-fourths of the bone was chiselled away, and trimmed into shape, the sinuses excised, and skin sutured. It healed quickly, and she was discharged cured in forty-one days.

Such hypertrophic sclerosis often leads to necrotic patches as in the following:—

Case III.—Lad, æt. seventeen, a large gumma in right patella, with gumma and caries deep as well as superficial in the left tibia. There were old standing sinuses. The disease was freely gouged away, and the wounds healed by granulation. He was fifty-two days in hospital.

In adults similar forms of syphilitic disease are frequently met with, but as the centres of ossification have lost their activity, the results of inflammation are far less marked. In 55 cases the periosteum was incised; and in 215 cases linear osteotomy was performed. In the vast majority of these relief of pain was immediate, and the wound healed under a single dressing. The stitches are removed about the eighth or tenth day.

In chronic neglected tertiary syphilis necrosis may occur.

The following is an example of syphilitic necrosis.

Case IV.—Kashmiri, duration of disease one and half years, various old syphilitic scars. On leg is a punched out ulcer, with overhanging edges, the floor is of rough black bones with foul smell. The sequestrum is about $3\frac{1}{2}$ inches \times $1\frac{1}{2}$ inches. Although not loose, after chiselling round the edges, the whole piece flaked off entire, leaving a healthy surface which granulated up in the course of a few weeks.

This is a type of necrosis sometimes seen in the skull as in a recent case where two-thirds of frontal bone came away in one piece; but such is not common in Kashmir. Perhaps the warmth and protection given by the turban account for this.

Tubercular disease.—The cancellous tissue of the smaller bones, or of the epiphyseal region of the long bones is especially liable to localised tubercle during the adolescent period. Caseation and softening occur, and the tendency is for the softening to extend in the direction of least resistance towards the skin, or into a joint, where it will set up tubercular arthritis; or sometimes the abscess will remain quiescent for a long period. If it bursts externally, a sinus is formed, and a septic caries results which is tedious in its course. Tubercle is comparatively rare in Kashmir, and in hospital practice it is the severer cases which are seen, so that operation is not infrequently required. Doubtless localised tubercle of bone will improve or cure under general treatment, but unless the patient will remain long under skilled supervision, it is better to operate in cases which might in England be treated expectantly. Where there is obvious suppuration in the neighbourhood of a joint, or elsewhere superficial, there can be no hesitation about the treatment. Example:

Case V.—Boy, *æt.* eleven years, duration of disease three years. Nodular swellings at epiphyses of the right radius, left ulna, and both tibials, and an ulcer over lower end of right tibia.

At each softened point an incision was made, and tubercular material spooned out; the softening extends one or two inches towards medullary cavity iodoform was filled into the hollows, and the skin sutured. All the wounds healed immediately, and the patient went home cured in twenty-six days.

Case VI.—Girl, *æt.* eleven years. The tubercular disease in this case was in the centre of the lower third of the tibia, which was much enlarged, and of fusiform shape. The medullary cavity was laid open by Dr. E. F. Neve, and the caseating deposit removed. The wound healed under a single dressing, and she was dismissed on the 20th day.

The above are good examples of the disease met with in the long bones. Occasionally small sequestra are formed, of cubical or cuneiform shape. These may be imbedded in granulations, so careful exploration should be made of all cases of tubercular caries, otherwise the discharge will continue.

I removed one sequestrum of this kind from an intra-pelvic abscess, connected with sacro-iliac disease; and in another case from a hollow in the crest of the ilium, both healed quickly. Tubercular dactylitis is only rarely seen in this country.

Other forms of tubercular osteitis will be mentioned in connection with joint disease. Spinal caries is comparatively rare. We have not found a sequestrum in any case. Our practice is to explore and flush out the abscess cavity, sometimes scraping the walls, and leaving iodoform emulsion in it, then stitching closely. Another form of tubercular disease, well defined clinically is known as *chronic abscess of bone*. Of these we appear to have had thirty-two cases, four occurred in the humerus, and twenty-eight in the tibia.

It is a disease belonging to the adolescent period, but of which the full manifestation may be delayed for many years. In our cases most of the patients were over twenty and few over thirty. In one woman there had been a painful spot in the lower end of the tibia for twelve years, upon drilling about 1 drachm of pus oozed out.

The more usual position is in the head of the tibia which might be called *the preferential site*.

Are all these cases tubercular? They are so classified in some recent books, *e.g.*, Treves' *System of Surgery*, vol. 1, p. 891. But in many the disease appears to be connected rather with old juxta-epiphysitis. I doubt if the distinction can be made clinically without the use of the microscope.

In two cases, men who had been operated upon for epiphysitis as lads returned several years later with bone abscess; and in one of them a third operation was required two years' later, when I removed the whole sclerosed osseous tissue on one side so as to allow the soft parts to fill the cavity. There was another elderly man with a cavity in his tibia, quite open externally, as large as a duck's egg, lined with ivory like bone. It probably originated as a bone abscess. I removed the inner part of the wall, and turned in a flap from the skin.

It was improved but not cured.

Leprous disease.—In the State Leper Asylum, which is under our charge, we see a considerable amount of bone disease, leading to greatly impeded power of progression, but only calling for comparatively trivial operative measures. The osteitis of leprosy is usually confined to the small bones, especially the phalanges of the hand, or the bones of the foot. Frequently there is rarifying osteitis, leading to absorption of the bone and great deformity, but without any suppuration. But when there is abscess formation necrosis is likely to ensue.

Portions of the carpal or metacarpal bones may then require removal; but the general condition of the member will not permit of any more extensive interference than the removal of sequestra, and provision of adequate drainage.

The rapidity with which a suppurative arthritis and osteitis in leprosy will sometimes subside is suggestive of some antagonism between the ordinary organisms of sepsis and the bacillus of leprosy.

Case VII.—Man, *æt.* twenty-two years, a leper. He has had a perforating ulcer of the foot for years with increasing deformity, and partial anæsthesia of the lower limbs. An irregular sequestrum about the size of a dice was removed from the base of the first phalanx of the great toe. The sinus closed, but has not entirely healed.

Osteo-myelitis is, certainly in this country, the form of infective bone disease which brings most surgical cases to hospital.

Of our bone operations, certainly 1,000 were connected with this disease. It has many clinical forms, but in all of them prompt and thorough surgical action is required. Briefly one may summarise some of the chief facts bearing upon treatment.

- (a) The chief starting point and focus of osteo-myelitis is on the diaphysial side of the epiphysial line. It may cause a localised abscess in this position; or
- (b) Sub-periosteal abscess extending along the whole or part of the shaft. If still more acute it may involve;
- (c) The other end of the shaft, which in such a case will lie almost entirely loose and swathed in pus;
- (d) One or both epiphyses may also be simultaneously diseased, with necrosis of the epiphysial disc, and not infrequently implication of the adjoining articulation;
- (e) The epiphysis may be the primary seat of disease leading to arthritis.

From the operative standpoint it is more convenient to revert to the classification in our tables, namely:—

- (1) operations for the relief of tension;
- (2) operations for the removal of diseased osseous tissue.

I think it may be asserted that in any case, however acute, if seen within a few days of onset, the only immediate demand is for relief of tension, and that in many of the acutest cases efficient drainage of the periosteum and bone will result in healing without necrosis.

It is indeed remarkable how many recover without necrosis, even when the disease has been progressing for a fortnight or more, provided the pus is evacuated aseptically.

The following are cases in point:—

Case VIII.—A boy, *æt.* nine years, was struck a month ago by a stone on the inner side of the thigh. Swelling and inflammation set in, and on admission to hospital there was great pain, with fluctuation in the lower half of the thigh, and also in the knee-joint.

Dr. E. F. Neve operated antiseptically, and found about a pint of thick sanguinous pus, the femur was quite bare for five inches, except a narrow line in front where the periosteum was adherent. The wound was drained for twenty days, by which time all the symptoms had subsided, and there was only a tiny sinus which soon granulated up. He was dismissed cured on the thirty-fifth day. In this case the disease was of one month's duration, and the knee-joint was inflamed, but no necrosis or stiffness of the limb resulted.

Case IX.—A girl, *æt.* eleven years, disease acute suppurative periostitis femur of fourteen days' duration. Half a pint of curdy pus was evacuated, and on exploration the whole shaft of the femur was found denuded of periosteum and bathed in pus. Iodoform emulsion was injected, and the wound closed at the time. It was re-opened and drained for a fortnight by which time it was completely healed. Total stay in hospital twenty-six days.

From our tables it will be seen that there were fifty-six cases of acute periosteal and epiphysial abscess; of these, one left hospital with unknown result, four are entered as improved, in these probably a sequestrum formed and had to be subsequently removed, and in the remaining fifty-one a cure was obtained, in most cases without any necrosis.

The importance of *early drainage of an epiphysis* is that the neighbouring joint may thus be saved, and often even after some arthritis has begun it will subside without local interference as in Case VIII.

Case X.—Boy, *æt.* seven, epiphysitis of femur with ankylosis of knee, of two months' duration, gouged internal condyle of femur and straightened knee. The wound closed by granulation, and he left cured after twenty-four days.

In the following case both femur and tibia were affected and the knee-joint slightly affected.

Case XI.—Boy, *æt.* nine years. Great swelling of whole lower limb of nine days' duration; an abscess was evacuated above the outer condyle of the femur which was bare. Another abscess of the tibia was incised three inches below the patella. Healing was accomplished gradually, but without necrosis. He was eighty days in hospital. Probably in this case it would have expedited cure had the bones been drilled freely. More extensive measures must be employed where the disease is already more advanced, as in *Case XV.* Girl, *æt.* sixteen years, with double juxta-epiphysitis. An abscess burst fifteen days previously. There is swelling all down the right tibia. I found both extremities of the diaphysis bare, and softened, and on gouging into them found pus extending for some inches into the medullary canal of which only about one-fourth was healthy. I laid it freely open, and scraped it out. The wounds granulated up in the course of about a month, and she made an excellent recovery, though hindered by a sharp attack of influenza and diarrhoea.

Sequestrotomy and Resection.—Where the bone is already necrosed, many different procedures may be adopted to meet the varying conditions.

It facilitates the explanation of our views on treatment to classify the operations as follows:—

(a) *Sequestrotomy*, i.e., removal of a sequestrum already loose or separating, with only such opening up of the new case, as permits of the exit of the bone.

In this country where so many patients are first seen at a late period of the disease, these operations are very numerous. Thus in the last five years there have been 85 sequestrotomies of the tibia, and 50 of the femur. In many of these the whole shaft was removed.

(b) *Gouging.*—It is often necessary to remove carious bone as well as a sequestrum to clear away unhealthy granulations, and explore for the presence of other sequestra. In the same five years this was done 66 times on the tibia, and seventeen times on the femur.

(c) *Evisceration.*—This consists in opening up the whole length of the shaft, and clearing out the greater part of the cancellous tissues. This is an operation which seems specially indicated in those cases of what we have called *spicular necrosis*; that is where the whole bone is in a state of acute central osteitis, which has led to the death of the bone, not *en masse* but in splintery fragments from 1 to 3 inches long, usually very irregular in shape, flattened and jagged. These sequestra are buried in pus-forming granulations, often in the interstices of vascular, perhaps sclerosed osseous tissue, which has to be freely chiselled away in order to obtain access to the disease. The whole bone

is usually much enlarged, and there are various sinuses leading to the surface.

The disease is essentially a most chronic one. I have seen cases of 20 years' duration. Without the surgeon's help the sequestra could never escape. And unless his first operation is a thorough one, hidden sequestra will prevent sound healing, and after months of treatment, the patient may have to be dismissed with some sinuses still discharging.

I have before me the notes of 20 cases in which evisceration of the tibia was performed.

AGE	under 10 years.	20 years.	30 years.	40 years.
	5	13	1	1

The stay in hospital ranged from 35 to 105 days, the average being 67 days.

In thirteen cases, or 65 per cent., healing was delayed, and there were persistent sinuses.

In 12 cases, or 60 per cent., the result was good at the time of dismissal; and probably in all the cases the final result was a thoroughly useful, if not always ornamental, limb.

The practical points against evisceration are two: the first, that unless very thoroughly done, under fairly antiseptic conditions, fragments of the bone left may exfoliate, and keep up discharge for some months, as in about 20 per cent. of the above cases. The second, that a very large cavity is left with bony walls, of which the vascularity is diminished; so that the efforts to granulate up are dilatory, and the granulations of poor quality, tending to break down again. These considerations have led us to practise the operation of *partial resection*, by which we mean sub-periosteal excision of a large proportion of the diaphysis, either as regards its length or its breadth. In the cases of spicular necrosis, as described above, the usual operation for partial resection consists in stripping the thickened periosteum back from the anterior and lateral surfaces of the tibia, and boldly chiselling away about three-fourths of its entire thickness, leading a strip of solid bone at the back. The continuity of the bone should not be broken. The periosteum should be carefully preserved. Selecting 20 cases of this for comparison.

Age under—

10 years.	20 years.	30 years.	
4	14	2	average 13 years.

The stay in hospital ranged from 30 days to seven months, the average being 79 days. When this operation is performed for splintery necrosis, it is undoubtedly successful, and gives better results than evisceration. I give an abstract of one or two typical cases.

Case XII.—Boy, *æt.* 8 years, under the care of Dr. E. F. Neve; disease of four months' duration. Tibia twice natural size with several cloacæ. Incision whole length of shin, chiselled

away the anterior three-fourths of whole of shaft, extracting various sized sequestra imbedded in interstices of bones, lower epiphysis also suppurating and upper affected.

A month later there was abundant bone formation, solid and of good shape; sinuses persisted in connection with the epiphyses, but healed six weeks later.

Case XIII.—Boy, *æt.* 10 years, disease of six months' duration; condition as in above case. I chiselled away all except a strip at the back of the tibia, and gouged both epiphyses. The skin wound mostly united primarily, except at old sinuses, and at the upper epiphysis. Gradually the renewed ossification gave a good limb. The boy left on the 74th day cured.

Many other cases resemble these closely. Were the disease confined to the shaft, much quicker results would be obtained as in a boy with disease of two-thirds of the diaphysis, which was chiselled away; and he healed well and was dismissed on the 47th day.

It is the carious cavities in the articular extremities of the bones which are so dilatory in healing.

Partial resection is also resorted to by us as a substitute for total resection in some cases of acute osteo-myelitis with almost total necrosis: especially in young people over twelve years of age.

For those under that age there need be little hesitation about removing the whole shaft, but at a period of life when the osteo-genetic power of periosteum and epiphysal cartilage begin to diminish, it is well to conserve a strip, however narrow, if it has any vascular connections; and fortunately the back of the tibia in the region of the nutrient artery often remains partly adherent to the periosteum when the shaft is elsewhere quite loose.

But there is some risk of part of the bone left becoming necrosed, and having to be subsequently removed, as has happened in two or three of our cases.

Neither in theory nor practice is it sound surgery to leave bone entirely destitute of vascular connections in a septic wound, it is bound to necrose and to keep up profuse suppuration.

Total resection.—By this we mean removal of the shaft of a long bone prior to the formation of a case of new bone. If a bony case has already formed, and the diaphysis is entirely separate, then its removal is only a sequestrotomy. In total necrosis the whole shaft may be lying loose, or it may be, more often is, adherent at one end. Its removal is a simple matter; it may be sawn across in the middle and each end be twisted off from the epiphysis. If one end of the shaft is adherent to epiphysis and periosteum, it should be left *in situ*.

Our records only show eight cases of total resection in the strict sense of the word. There have

been many more in which the whole shaft was removed after the formation of a new case, which are included in the sequestrotomies. But the sub-periosteal total resections are relatively much fewer than during the previous decade, while the proportion of partial resections has risen.

An analysis of the above eight cases shows that all were between the ages of nine and twelve. The disease was in all cases of over one month's duration. One girl was suffering from septicæmic fever and diarrhoea at the time and she died on the fourth day. Other cases were profoundly emaciated, but began to improve at once. The average duration in hospital was 84 days; but excluding one case in which necrosis of the epiphysis caused long delay, the average was 70 days. The following case is characteristic:

Case XIX.—Abdullah, *æt.* 12; disease of two months' duration; he is weak and emaciated; occasional diarrhoea. The tibial shaft is bare and separated at upper epiphysis, which is also necrosed. Through a 7-inch incision I removed the diaphysis, separating a few irregular patches of ossifying periosteum, and also extracted the central core of the epiphysis. The wound gradually granulated up. Healing was delayed by another sequestrum of the epiphysis. But in two months the leg was firm. There was a bend forward at the upper end of the new shaft, owing to the action of the flexors of the knee, which was contracted at the time of admission, and somewhat ankylosed. The improvement continued, and a few months later he was walking well without a stick.

The following table gives the approximate percentage of the different methods of operation on the tibia:—

<i>Sequestrotomy and gouging.</i>	<i>Evisceration.</i>
83	5
<i>Partial resection.</i>	<i>Total resection.</i>
10	2

The tibia has been dealt with fully as it is three times as often affected as any other bone.

The femur comes next in frequency, with a total of 116 operations, only one or two clinical points can here be noted about these.

(1) Owing to the depth of the bone from the surface, abscesses may exist for some time without either spontaneous evacuation, or opening by the *hakims*, so when brought to hospital the femur cases often run an aseptic course, and the gravest cases may heal well without necrosis.

(2) But many cases are brought to us with fracture of the thigh, protruding fragments of necrosed bone, extensive sinuses, and hectic from prolonged suppuration. In two such cases we have amputated the limb. Others have been taken away by the relatives to avoid amputation. But a considerable number of patients have recovered even from such a desperate state,

with shortened limbs, after resection of the diseased bone and prolonged treatment.

(3) Owing to relative difficulty of access and the importance of not imperilling the continuity of the bone, we have not practised such extensive and early operations as on the tibia.

Amputation should practically never be resorted to for bone disease, if uncomplicated, however extensive. In no case of tibial disease even with implication of the ankle joint did we amputate. But in disease of the femur with compound fracture, it may be necessary as in the two cases mentioned.

The mortality of bone operations is practically nil, but the mortality of bone diseases inadequately treated is considerable. The three deaths shown in our tables were due to delay in applying for treatment, and not to the exploratory operations which were performed. Perhaps some of those entered as 'left hospital' may have succumbed later.

PNEUMONIA IN THE TOCHI VALLEY.

By N. P. O'GORMAN LALOR, M.B.,

CAPTAIN, I.M.S.

Predisposing and Exciting Causes of the disease ; Characteristics of the Type : Treatment.

(Continued from page 131.)

A CHARACTERISTIC of that form of acute lobar pneumonia which prevails in the Tochi Valley is that it attacks natives almost exclusively ; Europeans appear to be comparatively immune to it. In discussing this question of susceptibility and immunity the first thing that strikes one is, that two individuals in an apparently equal state of good health and in identical external surroundings may contract a chill in the same way, and that one may suffer merely from an ordinary cold, while the other may be attacked by acute lobar pneumonia. The case is one that often occurs, and we explain it by saying that the individual singled out for attack by acute lobar pneumonia, had a constitutional predisposition to that disease.

As the lungs form the *locus resistencie* in acute lobar pneumonia, it may be presumed that certain chronic diseases which act as predisposing causes do so by lowering the resisting power of the lungs. It is probable that the resisting power of the lungs to disease depends ultimately upon the maintenance of a normal state of vitality of the epithelium of the pulmonary alveoli. How may variations from this normal state of vitality be produced ? Arguing from pathological considerations, one would say by two factors (1) Excessive work. (2) Deficient nutrition.

Is there any external condition of which we are aware affecting persons in sound health,

which can throw excessive work upon the epithelium of the pulmonary alveoli, and create at the same time a state of deficient nutrition of that epithelium ?

It seems that such an external condition may exist, in one form at least, viz., chronic insufficiency of ventilation.

Man, as we know, exhales from his lungs at each expiration minute quantities of poisonous organic substances, probably of the nature of ptomaines, into the air around him. In a confined space he can of himself poison the air he breathes, and when many people dwell in a confined space, the air in that space must be constantly loaded with these products. A chronic poisoning results from interference with the normal rate of excretion of these organic substances, or from actual reabsorption of them through the lungs ; this chronic poisoning when extreme, reveals itself by anæmia, lassitude and debility. In the attempt to get rid of these substances under circumstances of increased strain, increased work is probably thrown upon the epithelium of the pulmonary alveoli.

Natives of the classes from which our native army is chiefly recruited, are accustomed from their earliest years to live in small huts imperfectly lighted, without provision for ventilation, and overcrowded to a degree. Their fathers before them lived in a similar way. One may surmise from this history a chronic state amongst them partly hereditary but chiefly acquired, of lessened resisting power of the lungs to disease. The European in India on the contrary lives in large well ventilated buildings with plenty of air space, wherein overcrowding is not permitted to take place.

EXCITING CAUSES.

1. *Chill*.—The habits of the native expose him to the risk of many chills.

Hindus of high caste, for example, such as most Hindu sepoys and sowars are, will not cook their food and eat it, without first divesting themselves of nearly all their clothing.

Again, when a native, whether Hindu or Mahomedan, wishes to bathe, he does so in the open air without much reference to time of day, or to such conditions of weather as the prevalence of cold winds. Moreover he doesn't use a towel, and dries himself by standing about before putting on his clothes again.

The habits of Europeans do not expose them to chill to the same extent, as the above habits do, the native.

2. *Acute Malarial Infection*.—In nine cases out of thirty which I have recorded, of the type of acute lobar pneumonia which prevails in the Tochi Valley, acute malarial infection has immediately preceded the onset of the disease.

In three cases one paroxysm of malarial intermittent, in two cases a daily paroxysm on each of three days immediately preceding, in

two cases two paroxysms of tertian fever, in one case a paroxysm of malarial intermittent on each of two days immediately preceding, and in one case malarial remittent fever on each of four days immediately preceding,—ushered in the attack of acute lobar pneumonia.

In all the cases preceded by malarial intermittent fever, the onset of the pneumonia took place on the day succeeding the last paroxysm, and pain in the chest over the seat of subsequent attack was complained of during that paroxysm. In the single case mentioned, where malarial remittent fever preceded the onset of the disease, the symptoms of pneumonia appeared on the day following that upon which the patient's temperature first reached the normal.

As regards acute malarial infection, the European and the native suffer alike, so that if it be an exciting cause of that form of acute lobar pneumonia which prevails in the Tochi Valley, both are upon an equal footing with regard to it.

In discussing the subject of predisposing and exciting causes, the necessity of ultimate invasion by the specific germ of the disease is of course understood.

CHARACTERISTICS OF THE TYPE.

I now propose to mention certain characteristics of the type of disease which prevails in the Tochi Talley without going into more detail, than is necessary to explain the nature of these characteristics clearly.

1. *Spreading Character.*—This type of the disease manifests a spreading character as regards attack of portions of the lung not at first affected.

This peculiarity often results in an ultimate pneumonia involving, perhaps, the whole of one lung, and the basal lobe of the other, pneumonia at the initium having been apparently confined to the basal lobe of one lung only. This is an extreme case, but one that I have seen occur several times.

Occasionally, with the basal lobe of one lung pre-eminently attacked, one finds elsewhere in an otherwise unaffected lobe of the lung, a small area no bigger at first examination than a crown piece, over which the signs of a commencing pneumonia are appreciable, and from which spreading ultimately takes place; this area, moreover, seems at first to be sharply outlined from the rest of the lobe in which it is situated.

No doubt in other cases an area of this sort may be situated deeply in the lung, and escape recognition.

2. *Influence of Malaria.*—In many cases of the type of pneumonia I am describing, malaria has interfered, acting in a characteristic way upon the temperature curve sometimes prolonging the duration of the disease, increasing its severity, and rendering the patient more liable to relapse.

In most of thirty cases I have recorded, the æstivo-autumnal parasite of malaria was present in the blood during the course of the pneumonia.

3. *Duration.*—If by the term duration is understood the period which elapses between initial rise of temperature at the beginning of the disease, and final fall of temperature to the continued normal at its termination, the duration of cases of the type I am describing varied within wide limits. The longest duration I have seen with ultimate recovery has been twenty-one days.

When I discuss the subject of relapses it will be seen how often, relatively speaking, relapses occurred.

These, and cases of prolonged duration of the disease, I am inclined to attribute to the influence of malaria.

In other words, while relapses in a certain number of cases were separated by a measurable period from the primary attack, in other cases they formed one with it, and increased its duration in the sense in which I have defined that term.

In a certain number of other cases gradual defervescence took place during the course of the attack, to be succeeded by a gradual fresh rise of temperature before the normal had been reached during this period again, the symptoms and physical signs of pneumonia persisted.

3. *Relapse after a variable period of Convalescence.*—This phenomenon occurred in four cases out of thirty I have recorded. I give particulars of these cases in tabulated form:—

Duration of first attack.	Duration of relapse.	Interval between first attack and relapse.	Area of lung affected in first attack.	Area of lung affected in relapse.
4 days	5 days	27 days	Upper and middle lobes of right lung.	Lower lobe of right lung.
12 days	7 "	34 "	Whole of right lung.	Upper lobe of right lung.
5 days	3 "	14 "	Middle and lower lobes of right lung.	Middle lobe of right lung.
7 days	*13 "	18 "	Lower lobe of left lung.	Upper and middle lobes of right lung.

In all of these cases the predominant influence of malaria was evident in the temperature curve.

4. *The Virulent Type of the Disease.*—I have seen but a few cases of this type which occurs only when the disease is so prevalent as to almost constitute an epidemic, and I had no opportunity in these cases, of examining the sputum, blood, and excreta of the patient.

The special characteristic which, as far as I was able to observe, separated mild from

* More than this period as a matter of fact; I relinquished charge of the case on the 13th day of the relapse; the man ultimately recovered.

severe cases, and almost enabled one to predict beforehand the degree of severity which a case would assume, had reference to a pathological increase in the number of white corpuscles in the circulating blood.

I found, in the initial stage of every case of the disease, that the number of white blood corpuscles present in cover glass preparations of blood drawn from the patient's finger, was greater than the normal; this increase varied moreover with the severity of the case. It usually happened that when the increase was extreme, the case turned out to be one of severity, and that when the increase was slight, the case turned out to be one of mild character.

In cases of the disease wherein I was able to observe that the number of white corpuscles present in the blood at the outset, decreased during the fastigium of the fever, and that no fresh increase took place while the patient's condition was becoming more and more critical, a fatal termination ensued.

These blood changes I have described, the enlargement in cases of any severity, of the liver, spleen, or both,* and the presence of the "*Micrococcus Pneumoniæ Crouposæ*" in the urine during the course of certain cases of the disease, give colour to the supposition that a "*Micrococcus Pneumoniæ Crouposæ*" septicæmia may occur during the course of the type of acute lobar pneumonia I am describing; just as for example, a bacillus typhosus septicæmia may occur during the course of typhoid fever.†

If this surmise be correct, cases of the extreme type of severity might be of the nature of an intense septicæmia preceded by a brief period of local reaction. Such a supposition is at least not impossible.

5. Some Complications—

Albumenuria: This complication occurred in sixteen cases out of eighteen examined; the amount of albumen was fairly large in two cases, and slight in the rest. Of the two most marked cases, neither succumbed. (In both the specific gravity of the urine remained above 1020 throughout the disease). In four cases, the specific gravity of the urine was either low from the outset, or became less as the disease progressed; of these four cases two died.

Congestion of the Spleen: This complication occurred in nineteen cases out of twenty-seven. In two only of these cases was the edge of the

organ felt below the costal margin in mid expansion of the chest.

Congestion of the Liver: This complication occurred in seven cases out of twenty-seven examined. In one only of these cases was the enlargement such that the anterior edge of the liver descended more than one inch below the costal margin; in that case it was found about $2\frac{1}{2}$ inches below. The enlargement in all cases was firm and homogeneous.

6. *Accompaniments of Crisis*.—Out of fourteen cases in which record on the subject was accurate, crisis, was accompanied by polyuria only, in four: by diarrhœa only, in one: by diaphoresis only, in one: by a combination of all three, in one: by polyuria and diarrhœa together, in seven. Crisis therefore was accompanied in 50 per cent. of these cases by polyuria and diarrhœa.

TREATMENT.

I cannot say that any drug has proved a panacea for the disease in my hands. Careful nursing, and close observation of the patient have both been very useful. Judicious stimulation relaxed when possible, and if necessary pursued to an extreme, has helped cases through; so also has the hot sponging resorted to for the reduction of temperature. It occurs to one that another method of treating this type of disease is possible; a method based upon the observations and suggestions embodied in the report to which this is a supplement. It will be remembered that I suggested that the "*Micrococcus Pneumoniæ Crouposæ*" could probably, not only exist during passage through the alimentary canal of herbivorous animals (notably the horse and mule), but also multiply itself, and increase in virulence during that period. If this be true, it is possible that the poison which the living germ elaborates may be constantly being absorbed in the process of digestion and that the animal, in becoming inured to the presence of that poison may at the same time manufacture within his blood an antitoxin to it.

If this be so, the blood serum of such an animal would contain the antitoxin in an amount which would vary in different cases and at different times.

The blood serum of every such animal, however, especially under the circumstances of mixed overcrowding described in the report, would probably contain a proportion of antitoxin sufficient to exercise a beneficial effect upon the course of this type of acute lobar pneumonia. A standard dose say 25 cc. might be selected for injection purposes, and increased if found desirable.

The usual precautions with regard to the selection of an animal, and the taking of serum would be necessary.

* These splenic, and hepatic enlargements might be considered to have been caused by chronic malarial infection; I think that in all cases but one such was not the case, as these enlargements, in all but this single exception disappeared during convalescence.

† If such a septicæmia occur, it will be easy to understand that the "*Micrococcus Pneumoniæ Crouposæ*" might infect the alimentary canal and alimentary excreta of the patient. According to this view the presence of "*Micrococcus Pneumoniæ Crouposæ*" in the alimentary excreta of a pneumonia patient need not be due in every case to survival of germs derived from swallowed sputum.

From the nature of the suggestion made, one would not expect uniformly successful results to be obtained; the treatment however is one that should not do any harm.*

In alluding to the subject of general treatment of the disease, I should mention the necessity of giving quinine to combat the malarial infection which seems always to be present in cases of this type of pneumonia.

As far as my own experience goes, I have found that quinine is best administered in solution, in a dose varying from grs. v. to grs. x, thrice daily, during the progress of the disease.

Before concluding, I must acknowledge my thanks to Lieutenant Leicester, Indian Medical Service, for some valuable suggestions upon the subject-matter of this supplement.

SERUM TREATMENT OF PLAGUE.

BY B. KASCHADAMOFF, M.D.,

Russian Medical Service.

FROM the time of the discovery of the plague bacillus a new era in the study of plague began. All information gleaned in previous years has been subjected to close scrutiny from a bacteriological point of view.

During each epidemic the plague has been the subject of observation, and in this respect India is at present the most convenient country.

Of all questions the most important for preserving the lives of the patients is that of the treatment of the plague. It was naturally to be expected that by analogy with other infectious diseases (diphtheritis, typhus, entericus, &c.), that the manner of searching out the method of treatment of the plague should be based on the cause of the disease itself and should essentially be of bacteriologic origin. This conclusion is quite logical, therefore the endeavour to prepare anti-plague serum by the general method must not be considered to be something new and unexpected. At the same time is impossible to deny that even in India doctors have shown great distrust regarding the serum treatment of the plague before trying it on patients. Every one expects to have some assistance from doctors in India, but the latter have paid so little attention to the serum that the question of treatment of the plague with it is not considered to be solved up to the present. There were a few men who assisted at the time of experimenting with the serum, but the results of those experiments were so unsatisfactory that every hope of obtaining successful results were likely to disappear.

* Granting the validity of the theory upon which this treatment is based, there is room for doubt as to whether the amount of antitoxin contained in any ordinary dose of the serum would be sufficient to produce a marked beneficial effect upon the course of this type of acute lobar pneumonia. Trial alone will determine the point.

The treatment of plague with serum has been tried by many doctors (Yersin, Simond, Devin, Yassensky), but the greatest number of cases in a single series of experiments was very seldom more than fifty. In the selection of cases there was no system. Is it possible, when we have such a variety of plague patients, to be satisfied with fifty cases for drawing definite conclusions from? No, for the majority of these fifty cases may be the most severe or the most mild. Then in such a small number of patients it is impossible to study thoroughly the influence of the serum upon the course of the disease and to fix upon regular and individual doses. A proper dose of serum is one of the most important conditions of its beneficial influence.

That is the reason why we cannot call former experiments with the serum scientific. It is only since last year that the treatment of plague with serum was carried out on a larger scale. For this we are indebted to Professor Lustig and two of his pupils, Galeotti and Polverini, and to the very valuable assistance rendered by the Bombay Municipality, as well as by Doctor Choksey.

The treatment of plague with Italian serum may be divided into two periods—the first from the 12th of May 1898 to the 31st of May 1899, when patients for treatment were taken by selection, and the second from June 1899 up to the present, when every alternate case, in order of admission into hospital, was taken.

I will not discuss the advantages or disadvantages of both these methods of experimenting. It is quite enough to say that by the first method 475 patients were treated, and out of them 403 were in the Arthur Road Hospital.

The percentage of recoveries after treatment with serum was 38 and that without serum 19.5.

(To be continued.)

A Mirror of Hospital Practice.

ABDOMINAL SURGERY AT GAYA HOSPITAL.

BY C. E. SUNDER, M.B., (LOND.)

MAJOR, I.M.S.,

Civil Surgeon, Gaya.

DURING the last twelve months laparotomy has been deliberately performed eight times at the Gaya Pilgrim Hospital. This is probably an unusual number for a mofussil hospital in Bengal and especially as seven were women. The credit of it is due to the liberal spirit in which the Gaya Municipality has equipped and maintained its hospital, as well as to the hand-

some manner in which the District Board has recognised its duty towards the institution.

The details of the cases are given below. The five cases of ovariectomy are placed together and are published chiefly to draw attention to the evil effects of tapping, which are illustrated by Cases I, II and III, where the women's lives were endangered by an operation, the practices of which it is impossible to understand at the present day in a hospital as well equipped as is the local Dufferin Hospital. It is as has elsewhere been stated a practice that can afford only temporary relief, and may do infinite harm; and attention is drawn to it only because of the frequency with which it has been resorted to, about thirty times in the last four years at the strictly *purdah* Dufferin Hospital, though the majority of these cases were non-*purdah* women. Similar practice outside India would evoke something more than mere remark.

Case I.—Illustrates the development of ovarian cachexia under treatment by tapping, and this with Case II illustrates the adhesions that come thereby. One needs to deal with such adhesions in order to understand their danger and difficulty, which cannot be adequately realized from description.

Case II.—Further illustrates how bad practice may lead to worse when the case passes into the hands of a hospital assistant who infers the diagnosis from what was done at a hospital where he would expect the treatment to be correct.

Case III.—Illustrates the immediate danger from bursting of the sac which may follow upon tapping. The remote danger must also be remembered. Secondary peritoneal growths not unfrequently follow effusion of ovarian fluid into the cavity, a fact for which as far as I know no explanation has been offered. The broad pedicle of this cyst was so near the pelvic floor that enucleation would have been justified, but the results of enucleation are so grave that I am glad I ligatured at the base, even though part of the cyst wall may have been left in the stump.

Case IV.—Is the happy exception which proves the rule, though here we had only the woman's word for the tapping, as there were no scars.

Case V.—Is interesting because the cyst was, as far as I know, the largest on record in India. Lieutenant-Colonel Peck, I.M.S., removed a cyst containing 82 pints, and he knows of only one larger recorded in China, and said to have contained 150 pints, whereas this case contained 100 pints. Only her terrible conditions after three years of suffering drove this woman to the Pilgrim Hospital which she left plump and happy. She was poor but a high-class Brahmin and repudiated the suggestion of not being a *purdah* woman. The enormous size of her cyst must in some way have been associated

with the large bundles of veins running into it along a belt of omental adhesion more than a foot long. Fortunately the woman had had no trocars driven into her.

Case VI.—It is hard to see how one could have done otherwise, in this case. The large flux of blood for about three weeks out of four must soon have destroyed the woman whose life it had already made burdensome. She must have been a *purdah* woman, as she had been an in-patient at the Elgin Hospital, and as the status of her husband proved. Her suffering may be gauged therefore by her submission to examination by a man, a thing unusual among Mahomedan *purdah* women. Treatment with ergot had been given a fair trial. The only questions are—should one have waited or should one have enucleated rather than performed hysterectomy. Oophorectomy would have been as difficult as hysterectomy on account of the opening up of the left broad ligament. It is hard to refuse the chance of immediate relief, but I should do so in another similar case though I have seen excellent results in just such cases. As to enucleation I do not think many men would attempt it who have examined fibroids and realised the physical effort needed to tear them out.

Case VII.—That this was a case of sub-peritoneal hæmatocele probably due to a ruptured tubal pregnancy there could be no doubt. That it was of recent date, not more than a week old, was indicated by the history and by the increasing size of the tumour. But the history was false, as the husband admitted afterwards that there had been severe abdominal pain and swelling for over two months instead of five days, and the increase in size of the tumour I am to unable explain. The appearances of the clot removed clearly indicated the tubal rupture to be of old date, and I believe it may be referred to three months back when menstruation was supposed to have come on. *Post-mortem* examination verified what had been seen on the operating room. The hæmatocele had opened up both broad ligaments, and peeled the pelvic peritoneum off the posterior surface of the uterus, off Douglas's pouch and off the posterior abdominal wall over the lower half of the triangular area bounded on the sides by the descending colon and the mesenteric attachment.

The lower end of the mesentery itself had been opened up so that the lower ileum and the cæcum were in the wall of the sac of the hæmatocele. The right Fallopian tube was dilated where the mass of dark clot and embryonic remains had been removed at the operation. The left Fallopian tube was pervious to a fine probe which passed externally into a cyst, opened during the operation, on which the tube was lost (*Hydrosalpinx*). Ordinarily one would have opened the hæmatocele per vaginam, but in this case the probable rupture of the sac

justified the abdominal route. The emptied sac was lightly packed with sterilised Izal gauze which came out sweet and bloodless at the *post-mortem*. When seen at 5 P.M., the woman had a fair pulse, a strong voice and complained of only a little burning in the stomach. One found no cause of death other than shock.

Case VIII.—Archie Welsh's case illustrates the advantage of early operation when an intussusception is recognised to be of recent origin. The operation must have taken not much more than twenty minutes, and the simplicity of it would lead one to try the same practice in all early cases.

My thanks are due to Miss Friend Pereira, M.D., Brux., L.M.S., London, for sending me Cases I, III and VIII, and for her assistance at some of the operations. It is to her persuasion of the women to submit to operation that they owe their lives. The influence of the lady in charge of a zenana hospital is great, and grave is the responsibility of one who either by practice or by precept encourages ignorant suffering women to rest content with temporary relief at her own hands, or in any way deters them from seeking permanent cure elsewhere which she herself is either unwilling or unable to attempt.

I. Gariban, Mahomedan, 35, multipara, was admitted on the 25th May 1899, in the last stage of exhaustion and emaciation. She could neither stand nor walk from the weight of an enormously enlarged abdomen which concealed her feet from her view. She said she had been treated for several months at the Elgin Zenana Hospital, where she had been tapped five times during the last two years, and it was only under pressure that she was persuaded by the lady temporarily in charge of that hospital to come to the Pilgrim Hospital for radical treatment. She was non-*purdah*. The abdomen was absolutely dull except at the epigastrium. It gave the sensation of containing a tense moderately moveable cystic tumour probably adherent in front where there were the marks of five punctures. It lay rather to the right of the abdomen, and hung over in that direction. She had last menstruated five months ago. The cervix was found small, hard and conical, but the body of the uterus could not be made out.

Sound=2"—R point to left.

27th May, 1899, operation.—The abdomen was opened under chloroform, and the parietes separated with great difficulty from the cyst, which burst in the process and rapidly evacuated itself, the fluid filling two very large buckets, total quantity about 65 pints. It proved to be an ovarian multilocular cyst with a very broad pedicle, and full of gelatinous thick fluid, but, fortunately, not adherent except in front. The pedicle was tied with interlocking ligature, of Chinese twist, and after drying the peritoneum it was closed with silk-worm gut and dressed antiseptically. The operation took somewhat under an hour, and the patient was twice in danger from cardiac failure, which was met by ether and strychnia injections.

28th May, 1899.—Patient very feeble but breathes more easily. Temperature normal. Pulse fairly strong. Fed every hour with jugged chicken and given iced-water *ad lib.* in small doses.

29th May, 1899.—Doing well. Stool after glycerine enema.

The convalescence was slow. Union of wound by first intention. Patient sat up after ten days, moved about

after fourteen days, and was discharged on 20th June. She was an opium-eater and had been given the drug surreptitiously throughout. She has been often heard of since and suffers much from diarrhoea due either to the emaciated condition to which she had been reduced or to the opium habit.

II. Saifan, Mahomedan, 50, multipara, was seen at Jehanabad Dispensary. She was there being treated for ascites, a diagnosis which the hospital assistant arrived at from the treatment adopted at the Elgin Zenana Hospital where the woman had been twice tapped. She could not afford to pay her fare to Gaya any more, and the hospital assistant was, he thought, improving on the Zenana Hospital treatment by injecting tincture of iodine.

The abdomen was occupied by a cystic tumour, tense and fluctuating in some parts, but hard in others. It lay to the right of the abdomen and seemed to fill over two-thirds of it reaching up to the right costal arch. There was resonance only at the epigastrium.

P. V.—Large, hard, conical cervix occupies posterior cul with body of uterus antverted. Sound=2"—R. point forward.

10th October, 1899.—Laparotomy under chloroform. A large cystic tumour was exposed after breaking down or tying extensive anterior adhesions. Tait's trocar brought away a little fluid and then became blocked with viscid glary stuff. An attempt was made to lift the tumour, but it was found adherent to omentum above, and in front, and bound down posteriorly to the right by adhesions. The abdominal wound was enlarged to over 6" to break down and peel off these adhesions, and then the tumour was lifted off and held up while the various loculi were opened up internally, and the contents ladled out with the hand. When sufficiently reduced in size the whole mass was delivered. It weighed 6lbs. and the glary fluid 28lbs. The abdominal wound was closed as in the former case. The operation lasted about one and a half hours and there was only once some trouble with the heart. The after-treatment was as in the previous case. The bowels acted naturally on the third day. The sutures were removed on the seventh day, and the convalescence was uneventful. Discharged cured on 31st October, 1899.

III. *Jhalia*, Hindoo, 50 years, admitted on 24th November 1899, multipara, last menses five months ago, was sent from Jehanabad by No. II, Saifan. She had been tapped four or five times at Jehanabad, and on going to the Gaya Dufferin Hospital she was there tapped again as a case of ascites. The lady temporarily in charge had the courage to admit her mistake, and send the woman to the Pilgrim Hospital with a note. A considerable amount of viscid fluid had been removed. On examination next day there was obviously fluid in both loins and in the lower right quadrant a large tender solid mass was felt forming as it were a shallow cup surrounded by small nodules. These were the scars of six punctures in the middle line below the umbilicus attributed by the woman to previous treatment at the Jehanabad Hospital.

P. V.—Cervix bulky, os small, uterus antverted, right cul occupied by a solid mass filling the right half of pelvis and moveable with the mass felt abdominally. The abdominal enlargement was said to be of ten months' standing. An attack of diarrhoea prevented the operation until 27th November, by which time the abdomen had enlarged to a fair size again.

Operation.—The usual median incision was followed by an escape of thick viscid masses together with their fluid. The hard mass in the right iliac fossa was identified, as the base of a multilocular cyst which had opened up the right broad ligament. The cyst itself which had ruptured in front were punctured by the trocar in tapping, lay in the right loin half full of viscid fluid, similar fluid was found in every part of the abdominal

cavity. The cyst was withdrawn and below its base three interlocking sutures of Chinese silk were introduced and tied with difficulty, and the cyst then removed. As far as possible the sticky mass in the abdominal cavity was removed with soft sponges. Complete removal was impossible, and it was undesirable to further irritate the peritoneum which already showed signs of inflammatory reaction.

Chloroform was badly taken, and strychnia had to be injected twice. Recovery was uninterrupted. There was a little vomiting the first day and great thirst. She passed her urine naturally on the second day, and the bowels acted with a glycerine enema. Her one grievance was that she did not get enough food. She was discharged on 12th December 1899. Temperature normal throughout.

Weight of cyst 1lb. Fluid could not be measured.

IV. Sundari, multipara, Mahomedan, 36, from Haswa in Gaya District. Last menses fourteen days ago, admitted 16th February 1900. She gave a history of abdominal enlargement for ten years, which had been relieved by tapping at the Gaya Pilgrim Hospital and also at the Elgin Zenana Hospital; she had not been tapped for about three years, and there were no scars. Abdomen moderately enlarged and fairly flaccid; dull on the right side where by pressing in the middle line with the edge of the hand a cystic tumour could be demonstrated.

P. V.—Normal.

17th February, 1900, operation—chloroform.—Two-inch median incision exposed a cyst with lax walls. It was emptied with Tait's small trocar and a good pedicle found coming up from the left broad ligament. The sac was easily withdrawn, and the pedicle tied with Chinese silk (Staffordshire knot) and cut. Douglas's pouch was cleaned with a sponge which had, as I afterwards learned, been wrung out of 1 in 40 carbolic lotion without dilution with sterilised water. The wound was closed as usual. Next day she complained of pain, and on 19th there was fulness at the epigastrium. Magnesia sulph. half an ounce was given at once followed by drachm doses until the bowels acted freely. I believe the tympanitis was wholly due to the peritonitis caused by the strong lotion on the sponge. Uninterrupted recovery followed this action of the bowels. Temperature normal throughout. Weight of cyst $\frac{3}{4}$ of a lb. Fluid 16 pints.

V. Sundari, multipara, admitted 19th March 1900. Last menses one month ago. Emaciated, with typical ovarian facies. Brahmin *pardah* woman, age 30. She looked like a woman attached to a sphere, but she could still walk a few steps with assistance. She measured 57" with the tape drawn tightly round her just above the iliac crests, the umbilicus being at this level. From the lower end of sternum to the crest of pubis she was 39". The abdomen formed a tense fluctuating mass with a shallow groove obliquely across it. It was dull except in the flanks.

P. V.—Only a tense vault could be felt.

20th March, 1900, operation.—Chloroform given as moderately as possible. A one-inch median incision was made with the woman in the right lateral position and the cyst exposed. Tait's small trocar was introduced, and the fluid, which was a dirty brown colour with caseous flocculi, removed as slowly as possible. When a sufficient quantity had been removed, the wound was enlarged and the relations explored. The omentum was found adherent from right to left, and bundles of veins like earth-worms run into the cyst along the adhesion. The cyst was emptied, and the omentum tied and cut in bits from left to right between double ligatures. No adhesions were found behind, and the cyst was easily withdrawn. The bulky pedicle from the right broad ligament was tied in one piece (Staffordshire knot) and cut. Some fluid had to be mopped out of the pelvis. Wound closed and dressed as usual, but the usual many tailed bandage was supplemented by a broad roller to keep

together the abdominal walls which hung loose on the table at each flank. Recovery was uninterrupted. Bowels acted on second day. Temperature normal throughout. Cyst 5lbs. Fluid 96 pints measured, plus a good deal of spillage, say 100 pints in all. This is probably the record case of India. I have neither heard nor read of any larger except one in China, which is said to have contained 150 pints of fluid.

VI. Emaman, Mahomedan, *pardahnashin*, 35, multipara, admitted 9th October 1899, complaining of abdominal tumour with profuse and prolonged menstruation which rendered life burdensome. She said she had suffered for over three years and had been for three months an in-patient at the Elgin Zenana Hospital in 1897. She submitted to examination after a little fuss. A median hard moveable tumour occupied the pelvis and abdomen up to the navel.

P. V.—Culs clear, cervix conical and high up. Sound = 6 $\frac{1}{2}$ "—R. point to left. Bimanually the tumour was not as easily movable as it seemed to be abdominally.

11th October, 1899.—Laparotomy under chloroform readily exposed a fibroid tumour over the upper end of which the abdominal wall was extraordinarily tense (where the *sarce* was usually tightened) preventing exploration until the wound was enlarged considerably. Several adhesions to omentum and small intestines were peeled off or tied and cut, and then, on examining the tumour, it was discovered to have opened up the left broad ligament and become adherent to the colon and the rectum. With infinite difficulty the peritoneum was peeled off and stitched over the separated gut. An elastic ligature was passed round the tumour after its delivery, and when all was clear the ligature was tied, and the upper portion of the tumour amputated. The mucus membrane of the uterine cavity was dissected out, and the wire of a serrenœud applied under Koeberle's pins before removal of the elastic band. The chief difficulty was in separating the tumour from colon and rectum which took most of the time. The peritoneum was thoroughly mopped up with sponges, and then a collar of peritoneum sewed round the stump below the wire which had been carefully placed above the bladder. (An enormous right Fallopian tube simulated gut, but was identified and excised after ligature.) The wound was closed above and below, and the stump packed round with iodo-izal gauze and dressed loosely. The operation occupied over two hours, but the patient took chloroform well.

12th October, 1899.—Apparently doing well but complains of pain. Temperature 99°; vomited twice. Urine drawn off.

VI. 13th October, 1899.—Did not sleep, complains of pain about the wound, and there is considerable fulness at epigastrium. 5 P.M., abdomen tympanitic and bowels have not acted with enema. Magnesia sulph. two drachms ordered every hour until bowels act.

14th October, 1899.—Marked tympanitis; bowels have not acted. Died at 2 P.M.

Post-mortem.—Wound healthy; collar of peritoneum adherent to stump. Small intestines rather injected, but not particularly sticky. About four ounces of turbid fluid in the abdominal cavity.

Probable cause of death.—Paralysis of gut from handling which was unavoidable on account of the tightness of the upper part of the abdominal wall and the length of the operation.

This woman pressed for an operation, the danger of which was explained to her, but she preferred the risk to living in her miserable condition which had not been bettered by medical treatment.

VII. Sukni, Hindoo female, age 35, admitted 5th May 1900. She had borne one child seven years ago. For the last year she had not menstruated until three months ago when she had a little bloody discharge for one day, and her illness dates since then. It consisted chiefly of abdominal pain, which was not very severe until five days before admission when the abdomen was observed

to be swelling from below upwards. The pain was described to have been like labour pains for the last five days. The woman was very much emaciated and very anæmic, but she was strong enough to walk to hospital with help. The abdomen was occupied by a tender fairly tense tumour, arching up from the pelvis to the umbilicus. It felt softer to the right of the umbilicus than elsewhere, and was surrounded by resonant areas except in the left flank.

P. V.—The finger at once impinged on a sausage-like bulging of the posterior wall which reached up to the vault of the vagina. The cervix could not be felt, but a ragged os could be made out high up behind the right pubic bone. The uterine body could not be made out. Per rectum a bulging of the anterior wall was felt and tense fluctuation. Examination was very painful.

Diagnosis.—Hæmatocele, sub-peritoneal due to ruptured tubal pregnancy.

For four days the patient was kept in bed and given saline purges, while pain was relieved with morphia. On the 8th May, the tumour had reached a hand's breadth above the umbilicus, and the woman begged for relief by operation, the gravity of which was explained to her. It was decided to operate next day if no improvement appeared.

9th May, operation.—When the patient had been anæsthetized, I decided to operate by the abdominal route because the soft area (near the umbilicus originally) at the top of the tumour seemed to have given way; the tumour itself being much less tense. On cutting down to the peritoneum it at once began to bulge, and on opening it there was an escape of amber-coloured fluid. On exploring the tumour its lateral wall seemed to end at the pelvic brim, and on enlarging the wound upwards a rent was found at the posterior superior soft part. More posteriorly and attached right across to the top of the tumour was found the last part of the ileum which was traced to the cæcum (identified by seeing the appendix), itself attached to the right wall of the tumour. About half a bucketful of amber-coloured serum escaped, and the tumour was then drawn forward and emptied of masses of jelly-like amber-coloured clot intermixed with soft old whitish clot. The uterine body was identified in the anterior wall of the sac of the hæmatocele. A small cyst (parovarian?) was laid open in the wall of the sac below the left tube. The right tube was found dilated and ruptured, and from its interior a rounded mass of old and new clot was shelled out. Part of this old tumour was distinctly contained in a membranous sac, but no embryo could be identified. The abdominal cavity was then rapidly dried. The rent in the tumour was sewn to the peritoneum at the lower part of the wound, and the rest of the peritoneum closed by continuous suture. The abdominal wound was closed with silk-worm gut sutures, some of which passed through the tumour wall. An opening was left through which the cavity was packed with sterilised izal gauze drainage. Dressings as usual. The patient rallied well from the operation, and at 3 P.M. was talking. Temperature 98. She had a fair pulse and said her pain was less. Seen by me at 5 P.M., she complained of burning in the abdomen, but was otherwise apparently as well as before the operation. Temperature 99. At 10 P.M., she suddenly grew faint, and her pulse weakened. She died at 2 A.M. of 9th May.

Post-mortem.—About three ounces of fluid in peritoneal cavity which was perfectly closed off. It was seen that both broad ligaments had been opened up, and the peritoneum lifted off the back of the uterus as well as posteriorly from Douglas's pouch to the insertion of the mesentery which itself was opened up so that cæcum and lower ileum were in the wall of the sac of the hæmatocele. Death was probably due to shock. In this as in the previous case only a partial examination was made after death.

VIII. Archie Welsh, aged 6 months, was sent to me by Miss Friend Pereira, M.D. (Bux), at 4 P.M., on 20th

May 1899, and was operated upon within an hour. The child had had a large stool at 5 A.M., but began to cry at 8 A.M., and was given a dose of castor-oil by the mother. Two more stools were passed, and then only blood and mucus were passed apparently with great pain. When first seen the child was very pale, had a small rapid but regular pulse and was very drowsy, not being wakened by examination. A large typically sausage-shaped tumour was felt lying obliquely from umbilicus to left iliac fossa, and per anum the dimpled end of an intussuscepted gut could be felt.

Operation.—Under antiseptic precautions a 1½" median incision was made below the umbilicus, and on opening the abdomen the tumour was at once found. Holding it between fore and middle fingers they were passed downwards until the lower end of the intussusception was felt. The fingers were then drawn upwards pushing the intussusception before them and so emptying the descending colon. The gut was lost near the splenic flexure and recovered with difficulty; but this corner was finally turned, and the intussusception moved on without much difficulty to the ascending colon where some anxiety was caused by that gut becoming considerably dilated by the advancing mass which seemed to accumulate before the fingers without escaping. As the abdominal opening was being drawn on one side with the left hand to inspect one saw the intussusceptum suddenly escape into the abdominal cavity, the cæcum and vermiform appendix escaping last. The intussuscepted gut was very much congested and the mesentery purple in parts. Silk-worm gut sutures were introduced rapidly with a Reverden's needle, the peritoneum closed with continuous fine catgut sutures and the wound closed. It was powdered with iodoform and dressed with alembroth gauze. A firm bandage was applied.

On the seventh day the child was taken home after removal of the sutures. Recovery had been uninterrupted. The mother was warned to keep on a bandage for some months. The child was well and crawling about after a month which is possible as he was very big and strong for his age. To this his excellent recovery was probably due.

AN OUTBREAK OF CEREBRO-SPINAL FEVER IN THE RAIPUR CENTRAL JAIL IN 1899-1900.

By W. HENVEY,

CAPTAIN, I.M.S.,

Superintendent, Central Jail, Raipur.

(Continued from page 215).

This is sufficiently vague and does not advance matters much. Numerous bacteria are always found in the products of inflammation, of which the most prominent are the staphylococci (aureus and albus). The diplococcus, moreover, found by Professor Hankin was apparently free—at any rate, it is not stated to have had an intracorpuseular existence, and this quality of residing within the cells or corpuscles is, I take it, the specific feature of Weischelbaum's diplococcus, just as the gonococcus (a now well recognized and distinct species) is invariably intercellular. In addition to this investigation, Lieutenant-Colonel J. L. Poynder, I.M.S., was good enough to assist me in making cultivations and examining specimens of the secretion from several of the second series of cases. We found numerous

bacteria and cocci, but most of them were probably not pathogenic, and inoculations on agar-agar from the cerebral or spinal exudation invariably produced large colonies of the two staphylococci above mentioned in much greater abundance than any other form. In Case XII, a doubtful diplococcus was observed. But generally speaking, our investigations were not productive of any definite results. Though had I been furnished with a small pathological laboratory in the Jail (as has been recently suggested by the Director-General, Indian Medical Service) it is possible that I might have been more successful; as it was, all specimens, etc., had to be removed a long distance to the main dispensary, and it was only at intervals that I was able to obtain Lieutenant-Colonel Poynder's assistance.

Owing to the sudden departure of Captain W. Henvey on sick leave, this report was completed by Lieutenant-Colonel J. Poynder, I.M.S., who has added the following remarks:—

Having seen a number of these cases in this Jail, I may here offer a few remarks in continuation of Captain Henvey's very full report, as that officer has unfortunately had to take sick leave. In the case that I saw, there were distinct patches of deep congestion scattered about the lungs, and since I assumed charge of the Jail, another fatal case has occurred, in which the *post-mortem* appearances were precisely the same,—patches of deep congestion on the front of the lungs that were clearly not due to hypostatic congestion; and I think it is most probable that there is a direct migration of the microbe and deposit in the lungs; indeed, I believe from the generally congested appearance of the internal organs, that the microbe does not confine itself to the brain and spinal cord. I found in the fresh prepared specimen of the fluid diplococci free in nearly all the cases which I examined, but I could not obtain any cultures of any diplococci. The cultures showed only a very free growth of the micrococcus pyogenes, aureus and albus.*

As regards the causation, I cannot give any definite reason for the outbreak, but I have known this Jail a very long time, and it has almost always been very unhealthy, and one of the causes I believe to be the almost habitual overcrowding of the Jail. From many years experience in charge of the Sambalpur Jail, I found that the sickness and mortality were nearly always directly proportional to the numbers confined in the Jail.

I believe that not sufficient attention is paid to the serious obstruction to the perfusion of air by the surrounding and radial walls.

I have found that in the calculation of the accommodation, no notice has been taken of the

loss of cubic area, owing to the solid sleeping berths. In one barrack which I measured up, the loss amounted to 1,992 cubic feet on this account alone; this at 500 cubic feet per head, means almost four *berths* too much in that one barrack. Again, in estimating the accommodation, solitary cells, hospitals are all added together quite irrespective of the fact that they may or may not be half empty and therefore their accommodation may for some days not be available. I believe it will be found that the health of this Jail would be magically improved by a great reduction in the number of occupants, and a considerable and substantial increase in the areas and improvements in ventilation by lowering and removing more of the walls.

Remarks by the Administrative Medical Officer, Central Provinces.

From the date of this report to the 31st March, there have been ten more fatal cases of cerebro-spinal fever in the Raipur Central Jail, making a total of twenty-two. A nominal roll of these is appended.

With reference to Lieutenant-Colonel Poynder's remarks regarding the habitual overcrowding of this Jail, I have gone carefully over the returns for the first ten months of 1899 and find that on no occasion was there any overcrowding in the whole or any part of the institution. The total accommodation is 911, and the highest average monthly population was 771.61 for October.

It is noted that arrangements were made to prevent any particular building becoming congested. The ventilation has also been invariably described as satisfactory, and I may add that these facts were confirmed by me in my inspection on the 6th November 1899, only eight days before the beginning of the outbreak.

On that date, out of a population of 791, there were only fourteen in hospital, and among these no cases which could be ascribed to ordinary insanitary conditions, I recorded that the prisoners generally had every appearance of health, and as far as I could see, their physical condition was carefully looked after in every respect.

Major A. Buchanan, I.M.S., who has had a long experience of Jail management, was deputed by the Inspector-General of Jails to enquire into the origin of the outbreak, and his report contains the following remarks:—"The general condition of the Jail is extremely good. The latrines are in good order and clean; the barracks have been recently whitewashed. The food seems to be of good quality, and judging by the general increase in weights of the prisoners and by their good general condition, it appears to be suitable. There are no signs of scurvy, and the water-supply appears to be good."

* Loffeur's blood serum is the best medium for the diplococcus, agar is of much less value.—ED. I.M.G.

List of prisoners who died from Cerebro-spinal Fever from November 1899, to 31st March, 1900, in the Raipur Central Jail.

Serial number.	Register number.	Name.	Age.	Date of admission to Jail.	Date of admission to Hospital.	Date of death.	Barrack in which attacked.	Diet, i.e., rice, wheat, or juar, when attacked.	Class of labour.	REMARKS.
1	576	Khudi, U. T.	35 yrs.	6-11-99	14-11-99	16-11-99	XI U. T.	Rice	Under-trial	The under-trial end of No. XI barrack.
2	4463	Kegli	35 "	29-10-99	19-11-99	19-11-99	VIII	Rice and juar	3rd Class	Juar for morning cake only.
3	4242	Balar	63 "	2-8-99	17-11-99	21-11-99	V	Rice	Infirm. gang.	
4	4351	Manbodh	33 "	2-10-99	19-11-99	23-11-99	VIII	Rice and juar	1st Class	Juar for morning cake only.
5	639	Gobardhan, U. T.	20 "	4-12-99	12-12-99	14-12-99	XI U. T.	Rice	Under-trial	The under-trial end of No. XI barrack.
6	4526	Sarha	25 "	7-12-99	16-12-99	16-12-99	XII	Rice and wheat	3rd Class	Wheat for morning cake only.
7	4356	Uthai	18 "	13-9-99	13-12-99	17-12-99	XII	Rice and wheat	1st Class	Ditto ditto
8	4522	Dum Dum	40 "	6-12-99	22-12-99	22-12-99	IV	Rice and wheat	1st Class	Ditto ditto
9	4177	Yakub Khan	51 "	6-7-99	20-12-99	26-12-99	V	Rice and wheat	2nd Class	Ditto ditto
10	4537	Mangloo	40 "	12-12-99	26-12-99	26-12-99	IX	Rice and wheat	1st Class	Ditto ditto
11	4298	Sukhdeo	38 "	29-8-99	29-12-99	30-12-99	V	Rice and wheat	1st Class	Ditto ditto
12	4449	Decha	42 "	26-10-99	6-1-1900	13-1-1900	VI	Rice and wheat	3rd Class	Ditto ditto
13	3736	Khair	46 "	15-10-99	15-1-1900	18-1-1900	VIII	Rice	Infirm.	
14	2253	Sukaloo	25 "	28-2-97	17-1-1900	20-1-1900	VI	Rice and wheat	Convict overseer	Wheat for morning cake only.
15	377	Mussummat Sewati	35 "	12-1-1900	22-1-1900	24-1-1900	Female Barrack No. 1.	Rice	Hospital.	
16	4625	Padree	26 "	9-1-1900	27-1-1900	28-1-1900	XII	Rice and wheat	2nd Class	Wheat for morning cake only.
17	4290	Bhakarnand	23 "	25-8-99	27-1-1900	29-1-1900	IX	Rice and wheat	1st Class	Ditto ditto
18	4534	Tholo	45 "	9-12-99	5-1-1900	5-2-1900	II	Rice and wheat	1st Class	Ditto ditto
19	4678	Chain Singh	21 "	24-1-1900	19-2-1900	26-2-1900	VIII	Rice and wheat	3rd Class	Ditto ditto
20	663	Kewal Singh, U. T.	38 "	19-12-1899	28-2-1900	7-3-1900	XI U. T.	Rice	Under-trial.	
21	224	Hirao, U. T.	37 "	26-2-1900	14-3-1900	18-3-1900	XI U. T.	Rice	Under-trial.	
22	4660	Jerawan	65 "	22-1-1900	24-3-1900	26-3-1900	VIII	Rice and wheat	3rd Class	Wheat for morning cake only.

THE
Indian Medical Gazette.

JULY, 1900.

THE PTOMAINÉ ORIGIN OF SCURVY.

A REMARKABLE article appeared in the *Lancet* of 28th April which is of great interest to us in India, where the prevalence of scurvy or at least a scorbutic taint is still very commonly put forward as an explanation of certain phases of ill-health in our jails and not infrequently in our Native regiments.

The article in question is written by Mr. Frederick Jackson (the well-known intrepid Arctic explorer), in conjunction with Dr. Vaughan Harley, and is based upon the Arctic experiences of the crews of the *Windward* and the *Fram* and other recent Arctic explorings. The reaction against the time-honoured view that scurvy is caused by the want of fresh vegetables or of lime-juice may be said to have begun with the publication of the article by Dr. Neale in the *Practitioner* in 1896. Dr. Neale was led to his view by the remarkable escape of the wrecked crew of Mr. Leigh Smith's ship, the *Eira*. After the loss of the *Eira* the crew lived for no less than nine months, including a winter, on Franz Joseph Land under the severest and necessarily the most insanitary conditions imaginable, yet not one of them contracted scurvy, yet they were entirely without lime-juice or fresh vegetables, but they had plenty of freshly killed bear's meat and walrus meat. In the same way Nansen and Johansen lived without lime-juice or fresh vegetables for nine months on Jackson Island on similar food without contracting scurvy. Contrast these experiences with those of the crews of the *Alert* and *Discovery*, in the Nares Polar Expedition, where the crews suffered greatly from this disease, though abundance of lime-juice was served out daily to all hands during the whole of the expedition.* To these experiences Mr. Jackson adds some of his own

he tells us that while living among the Samoyads on Waigatz Island he observed some striking facts as to the causation of scurvy. The Samoyads who winter on this island never take vegetables and never heard of lime-juice, yet scurvy among them is unknown; they live however entirely on fresh reindeer meat. On the other hand some of the Samoyads who migrate south for the winter and live with the Russian traders, near the Yugor Straits, almost entirely upon tainted salt fish, suffer severely from scurvy. Again a party of Russian priests who lived one winter among the Samoyads, but whose religion prevented them from feeding on fresh reindeer meat, all died of scurvy before the summer came round. Another experience Mr. Jackson considers of special importance in supporting his own theory of the origin of scurvy, is that of the two parties belonging to the Jackson Expedition of 1894-7. The party which remained on board the ship for two winters had taken their daily tot of lime-juice with unfailing regularity, yet they suffered severely from scurvy, whereas the party which lived on shore took no lime-juice and lived for two years without a trace of scurvy, but (and this Mr. Jackson considers is the important point) the party on board the *Windward* lived all the time on tinned meats and salted meats, whereas the party on shore lived chiefly upon fresh bear's meat, and if they used tinned foods, they always very carefully scrutinised them to make sure that they were quite fresh. From these facts our writers conclude that neither lime-juice nor fresh vegetables prevent scurvy nor cure it, and that it is not a disease produced by the absence of these articles, but is produced by the eating of tainted food.

This view that scurvy is essentially due to poisoning by the ptomaines of tainted animal food is one which was first propounded by Professor Torup, of Christiania. Our authors say that in the many instances of scurvy which they have investigated in no instances have the circumstances rendered inadmissible or even improbable the theory that the disease is due to ptomaine poisoning. Before giving lime juice the credit for banishing scurvy from the Royal Navy and Mercantile Service we must remember, they tell us, that at the same time many other sanitary improvements were effected, and above all there was an improvement in the nature of all the food supplied to sailors.

* It may, however, be remembered that in the discussion on the scurvy of the Nares Expedition the *British Medical Journal* challenged the correctness of this statement and maintained that alcohol was substituted for lime-juice, which was not regularly administered.—ED., I. M. G.

So much then for the historical evidence in favour of the ptomaine poisoning view of scurvy; our authors next proceeded to test their theories by experimenting upon monkeys. The monkeys were divided into three groups,—(1) the first batch were given daily boiled rice and 50 grammes of meat from a freshly opened tin; (2) the second batch got the same amount of food, but the meat was taken from tins which had been open in the Laboratory of University College for several days, and it had a distinctly sour smell; (3) the third batch of monkeys were fed on the same tainted food as in No. 2 batch, but in addition each monkey received either an apple or a banana daily.

In the first group the only symptom noted was a diarrhoea, and none of them showed anything of the muscular feebleness or general ill-health noted in the scorbutic monkeys of the other groups. In the second group, fed on the tainted meat, the monkeys showed a much greater prostration, and six out of the eight passed blood and mucus in their motions, and in the third group (which received an apple or plantain in addition to the *tainted* meat) the same symptoms of blood and mucus in the stools appeared. As regards the conditions of the gums in the three groups:—in the first batch not one showed any trace of spongy gums, whereas in the second batch no less than five monkeys showed sponginess and even ulceration of the gums, and in the third batch, in spite of the fresh apple or banana each day, four out of five had bloody mucus in their stools and two of them had spongy and bleeding gums.

Our authors, therefore, conclude that these experiments on monkeys confirm their views on scurvy, which is according to them a form of slow ptomaine poisoning, produced by the continued consumption of tainted meat, and that the state of preservation of the meat is the essential factor in the etiology of the disease.

We cannot, however, leave the question in this state, for it must be considered how the facts and observations here set forth are in accordance with what is known of the occurrence of scurvy in India. We are not aware of any distinction ever being made between what is known as sea and land scurvy—both have been considered as identical in their symptoms. We are at once, therefore, met with the objection that ptomaine poisoning from tainted meat will certainly not explain the presence of what is usually consider-

ed as scurvy in our Indian jails or in Native regiments on field service. Nor will it explain the occasional occurrence of what is called scurvy in cachectic but certainly well-fed British soldiers. We have on former occasions expressed the opinion that much of what is called "scurvy," in Bengal jails at least, is not really scorbutic, but due rather to neglect of the teeth and to the debilitating effects of fevers; but we are bound to admit that in the jails of other provinces there is a good deal of what the medical officers have no hesitation in calling scurvy, and it is a condition which numerous medical officers have noticed to disappear on the issue of fresh vegetables in the cold weather. The ptomaine theory may possibly explain the origin of the scurvy which existed in the famous beleaguered garrisons of Ladysmith or of Mafeking, but it will not explain the undoubted occurrence of scorbutic symptoms among the Native troops on field service, such as we saw for ourselves on the Chin-Lushai Expedition of 1890; these troops at times suffered from a want of vegetables, but they certainly never suffered from the effects of eating tainted tin meat. Another criticism will occur to the reader, that is, how the meat turned bad in the cold microbeless atmosphere of the Arctic regions, nor is it clear why tainted tins were eaten when from all we have heard of the Jackson Expeditions there never was at any time any shortness of provisions.

The theory as worked out in the article before us is a plausible one, and it has apparently many facts to support it, but it most certainly will not explain land scurvy among the cereal-eating nations of the earth, many of whom never touch meat, fresh or tainted, in any form.

ON TAPPING OVARIAN CYSTS.

To call attention to the manifold evils of tapping ovarian cysts within a few months of the commencement of the twentieth century, may appear to many as "wasteful and ridiculous excess," were it not that we have good reasons to believe the practice is still adopted by some of our native subordinates and even, as will be seen by an article in another column, in some of the Dufferin Hospitals. For diagnostic purposes the removal of fluid is useless, since we can only say with Grieg-Smith "that a fluid is ovarian with a greater probability of truth than

we can say it is not, the diagnosis is made by other means." Tapping as a surgical procedure should only be resorted to for temporarily relieving symptoms in certain exceptional cases, for, to quote Grieg-Smith again, "As a method of cure it has long been accounted futile. And even as a means of ameliorating symptoms, it is doubtful if the combined risks, immediate and remote, are not always as great as those following complete removal of the tumour. The occasions on which tapping may be legitimately adopted are two-fold: *firstly*, when removal of the growth is inadmissible; and, *secondly*, when the patient is suffering from some incidental ailment which renders postponement of operation necessary. In the first case tapping is used simply to promote euthanasia; in the second to gain time for improvement of the patient's condition. The coincidence of any grave and incurable disease, such as cancer, phthisis or advanced disease of the heart, or in fact any condition which negatives surgical operation of any sort, negatives ovariectomy. Here tapping may be advisable to prolong life, or to render it less painful." On the other hand, if the "patient is suffering from an acute disease—such as bronchitis or pneumonia, or typhoid fever which negatives ovariectomy, and the progress of which is likely to be favourably influenced by relieving a distended abdomen, tapping is expedient. Also in chronic complaints such as bronchitis with dyspnoea, tapping may contribute to the patient's improvement, and so increase the chances of success for the major operation. When the renal functions are upset, or when there is œdema of the limbs from pressure, or generally when the condition of the patient is deteriorated by the existence of intra-abdominal pressure, tapping may, by temporarily removing the pressure, cause natural improvement in the patient's condition."

In pregnancy tapping as a palliative measure may occasionally be the best course, although there are a large number of cases in which the removal of ovarian cysts by abdominal section has not interfered with the natural course of pregnancy, still these cases must each be carefully considered. Tapping may also be required when an ovarian cyst interferes with the progress of labour. The objections to tapping are its futility, in all but some simple cysts of the broad ligament, and even with these cysts there

is no certainty that they will not refill. On the other hand, it is practically impossible to diagnose them, without operation, from those unilocular cysts, springing from the hilum of the ovary, or the paroophoron that are most prone to contain papillomatous growths. Puncture of the cyst wall may, from some cause or other, allow the escape of fluid into the peritoneal cavity, with all its attendant dangers, including a malignant infection of the peritoneum with papillomatous growth. Experience has shewn that after the withdrawal of fluid from a true ovarian cyst, reaccumulation invariably takes place, necessitating more and more frequent tapping, if the treatment be persisted in, until the patient dies exhausted. The operation holds out no prospect of cure, but as a matter of fact is usually the precursor of a more rapidly fatal termination than would otherwise be the case. In addition to the risks of wounding a vessel in the cyst wall or omentum, puncture of adherent intestine or bladder, suppuration setting up in the cyst, there is the adhesive peritonitis set up by the tapping and consequent adhesion round the cyst. An operation undertaken after the cyst has been tapped may be one of the most difficult in surgery, and with great risk to the patient. On the other hand, an operation for the removal of an ovarian tumour of moderate size, undertaken while the patient is in good health, and in which no tapplings have set up adhesions, is perfectly simple and almost free from risk to life. It would perhaps be well if, when the operation of tapping for ovarian cyst appears in the returns of any institution, the reasons for the procedure were ordered to be noted at the same time.

When from inexperience or from want of confidence the operation for the removal of the cyst is not undertaken and skilled assistance cannot be called in, let the patient be taken to an institution where it will be done.

By tapping the patient's chances of being cured are diminished, and her disappointment is great on the refilling of the cyst. She probably does not again apply for treatment until near death's door, and then to someone whom she has heard makes permanent cures. Her chances of recovery from ovariectomy are now much less. If she dies, the operation and operator are discredited, and the progress of surgery in this country retarded.

LONDON LETTER.

THE ARMY MEDICAL DEPARTMENT REPORT FOR 1898.

THE health of the British Army in 1898 was not so good as in the previous year and preceding decennium. This was in some measure due to the military operations undertaken during the year. The Tirah and Malakand Forces were not very large, and they were employed for only a part of the year; but they suffered severely from malarial, enteric, and other fevers, from dysentery, diarrhoea and chest complaints. The Nile Expedition was on a larger scale, the strength of the force being about 8,000. The climate was trying and the work arduous, and the disability and loss caused by enteric fever, dysentery and diarrhoea very considerable. The troops on their return from service continued to suffer, and this raised the sickness and death-rates of stations to which these were distributed. The employment of troops in Crete in September was attended with a good deal of sickness caused by malarial and enteric fever, and raised the figures of Malta, from which command they were detached. With these exceptions the circumstances of the year were not peculiar, nor characterised by any special departure from the conditions affecting the health of the army in recent years. The admission rate was 981·9 per 1,000 against 971·5 in 1897 and 966·3 in the decennium 1888-97, and the constantly sick-rates for these periods 59·44, 62·25 and 59·37. The death-rate was 10·82 against 9·35 and 8·86, and the invaliding rate 17·46 against 18·30 and 15·01. The commands in which there was a decided excess of mortality were Malta, Egypt and Cyprus, South Africa, and St. Helena and India. There was a marked reduction of mortality in Bermuda and Mauritius. The experience of the year indicates that the effects of active service are not limited to the area and period of operations, but are diffused as regards space and time by the dispersion of the troops engaged, and thus compromise the statistics of the army as a whole and linger for a considerable time beyond the close of the war.

ENTERIC FEVER IN THE BRITISH ARMY.

It is well-known that enteric fever constitutes the principal cause of mortality and venereal diseases of sickness in the British Army. It has also become evident that enteric fever is

the most formidable cause of loss of life in war. The disease prevailed with severity among the troops employed on the Indian Frontier, was very conspicuous in the Nile Expedition and at Crete, and the casualty lists published from time to time from South Africa show that the great majority of deaths due to disease are caused by enteric fever. It is noted in this report that "the liability of troops on service to enteric fever, even when encamped on what appears to be virgin soil, is a fact in regard to which almost all observers are unanimous." The inference therefore is that the disease accompanies troops on service, and that the circumstances of service enhance the liability to attack and impair the resistance to infection. It is doubtful whether enteric is a permanent occupant of the Soudan or prevails habitually among the resident population, and the experience of the French Army in Algeria proves that if the infection is not encountered and contracted in North Africa, the conditions are eminently favourable to its development and spread. In South Africa it is quite certain that the disease is habitually and severely prevalent, at any rate among the white population, and more especially in the summer season. An interesting paper (by Major R. J. S. Simpson, R.A.M.C.) is appended to the present report, showing that enteric fever is very rife at Maritzburgh and other stations and towns in South Africa. The infection was therefore present in abundance in the area of war, and the circumstances of service have been conducive to its development not only among British Troops but among the Boers also, as shown by the number of casualties which occurred in Cronje's army after its capture.

Increased admission and death-rates are shown by most of the stations of the British Army in 1898. The most marked increases are exhibited by the figures of the United Kingdom, Malta, Egypt, South Africa and India. On the other hand, Bermuda, which used to occupy a very high place in the list of enteric fatality, shows a remarkable reduction—the admission rates having fallen from 34·8 to 15·0, and the death-rates from 6·28 to 2·31. This decrease is attributed to improved sanitation, better protection of water and more careful disposal of sewage.

PREVENTIVE INOCULATION FOR ENTERIC FEVER.

In the light of these facts the prevention of enteric fever in the British Army assumes a

position of the highest importance, and the experiment which is now being carried out on a very large scale of preventive inoculation according to the method devised by Professor Wright is of very great interest. Steps are being taken to collect accurate statistics on this subject, and these will be collated and published in time; but the feeling at present among those who have had opportunities of gaining information appears to be that, while these inoculations do not confer an absolute immunity, they seem to modify the severity of the attack. This of itself would be a valuable result and would contribute to the saving of suffering and life; but if the liability to contract the disease is not materially diminished, the main object of the proceeding will not be accomplished. Figures collected in India appear, however, to establish that these vaccinations do confer a considerable immunity against attack.

VENEREAL DISEASE IN THE BRITISH ARMY.

THERE has been a marked fall in the prevalence of venereal disease in most stations. In India the admission rate from all forms was 305.5 against 422.5 in 1897, and 381.6 in 1888-97. The new Cantonment Rules came into operation towards the end of 1897. There has been a decrease in twelve stations where they have been in operation, an increase in five, and no change in one. Circumstances in different cantonments vary so greatly that a special inquiry is necessary to determine the value of such figures. Absence on service was not a material factor of reduction, because the main decrease took place during the latter half of the year when all British troops were in cantonments. Placing bazaars beyond bounds on account of plague and for other reasons is said to have contributed to diminution, and credit is given to moral influences brought to bear upon soldiers. The disability caused by these diseases is still very great; and the reduced figures of 1898 leave plenty of room for further diminution.

THE RETURN OF SIR WILLIAM MACCORMACK AND MR. F. TREVES.

THESE gentlemen have come from the seat of war full of information regarding the medical and surgical incidents of the campaign. They have been interviewed and entertained, and have given free expression to the impressions gained by their varied and ample experiences. Both

gentlemen are loud in their praises of the excellent arrangements which have been made for the care and treatment of the sick and wounded everywhere, and of the devoted and skilful services rendered by officers of the Royal Army Medical Corps, by Civil Surgeons attached to the army, and by nurses. Mr. Treves has raised a tempest by his remarks on the "plague of women" in South Africa. He has explained that he does not include in his denunciation those women who minister in hospitals to the comfort of disabled soldiers; but refers to that swarm of feminine visitors who have been attracted to South Africa by motives of curiosity and a morbid desire for excitement, and who haunt the hospitals and torment their inmates for the sake of satisfying these cravings. He simply reiterates from the medical point of view, the complaint made by the Chief Commissioner on social and economical considerations regarding the intention of idle and meddlesome persons at a time when monied loiterers are a hindrance and nuisance in places where society is more or less disorganised, the amenities of social life are in abeyance, the cost of living and commodities is raised, and multitudes of indigent and homeless people have to be looked after and provided for. Mr. Treves' speech has given deep offence in some quarters; but if his observations will lead to restraining the southward flow of gaping and intrusive tourists, their bluntness may be condoned. As regards the professional gleamings, their wanderings among camps and hospitals, both gentlemen have already contributed much interesting knowledge and will no doubt at their leisure, supply more.

THE VICTORIA CROSS.

THIS coveted and honourable distinction has been bestowed upon Major William Babbie, C.M.G., of the Royal Army Medical Corps, for conspicuous bravery at the battle of Colenso on the 15th of December last. When the 14th and 66th Batteries of the Royal Field Artillery got into difficulties, Major Babbie proceeded to attend to the wounded under very heavy rifle fire and later in the day went out under heavy fire to bring in the late Lieutenant Roberts, R. A., who had been fatally wounded in this disastrous engagement. Many other medical officers have distinguished themselves in a similar manner in this war and it is to be hoped that their bravery

and coolness in danger will be similarly acknowledged. The roll of the Victoria Cross includes about twelve medical officers whose names recall deeds of valour displayed under circumstances of peril and distraction, showing that the devotion to duty, which is the mainspring of the doctor's life, is apt to rise superior to all considerations of personal safety.

3rd May 1900.

K. McL.

Current Topics.

THE BIRTHDAY HONOURS LIST.

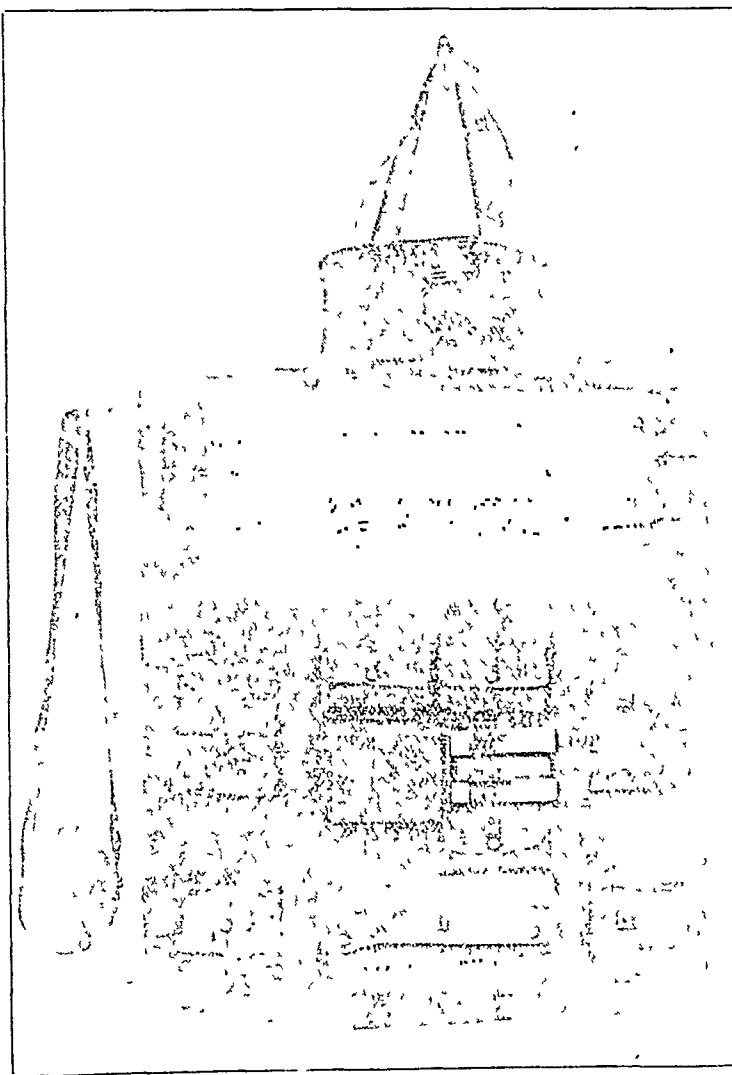
THE list of honours published on the Queen's Birthday, May 24th, 1890, is not a very long one, nor exceptionally interesting, except for the first distribution of the new Kaiser-i-Hind medals. We are pleased, however, to see that the medical services find a place in the lists. Lieutenant-Colonel Aylmer M. Crofts, I.M.S., for many years Residency Surgeon at Gwalior, receives the C. I. E. Of the Kaiser-i-Hind medals the first medical name on the list is that of Lieutenant-Colonel R. Neil Campbell, I.M.S., for many years Civil Surgeon in Assam; next comes Captain C. H. James, I.M.S., who has for some years past been working hard to check plague in the Jullundar District. In the silver medal list we find the names of Captain J. W. Grant, M.B., I.M.S., who has worked on plague duty and is now on famine duty in Rajputana. Lieutenant-Colonel K. S. Nariman, I.M.S., Civil Surgeon of Surat; Major D. W. Scotland,

I.M.S., Civil Surgeon, Bulundshahr; and Major H. W. Stevenson, I.M.S., lately plague officer at Mau-Aima in Allahabad District. Other members of the medical profession who receive the medal are Mrs. Henry Smith, M.D., of Jullundar, and Miss Charlotte Adams, M.D., of Jodhpur; Dr. D. A. Choksi, L.M. & S., chief plague officer, Bangalore City; Miss S. Campbell, L.R.C. P. & S., of Ajmere. The title of Rai Bahadur is conferred on Babu Upendra Nath Sen, an Assistant-Surgeon, Bengal.

A NEW PATTERN SURGICAL HAVERSACK.

We have received a pamphlet describing a new pattern surgical haversack, designed by Captain N. P. O'Gorman Lalor, I.M.S., for use on field service. The illustration which we here give of the unrolled and open haversack will explain very clearly the advantages which it has over

the crowded bag now used as the field service haversack. A still further improvement has been made on this haversack by Messrs. Down Brothers, the surgical instrument makers. The contents of the improved haversack are as follows:—Bandages, field tourniquets, Pettit's tourniquet, Esmarch's bandage, two pieces of Gooch's splint material, a bundle of tenax, of cyanide gauze, a suture book containing 12 Hagedorn's needles, silk, pins, &c.; scissors, knife, gutta-percha tissue, candle and matches, tape, one dozen "first field dressings," and a medicine case containing



of ammonia, morphine solution, minim glass, iodoform, carbolic acid, saline tabloids, &c. The external measurements of this haversack

are—length $11\frac{1}{2}$ in., breadth $18\frac{1}{2}$, thickness $6\frac{1}{2}$ in., when folded up. Its whole weight is only 10lb. 8oz. All the pockets close by spring buttons.

The advantages of this haversack are as follows: (1) the contents are rapidly and easily got at; (2) the amount of splint material is greater, and takes up little room; (3) this haversack contains enough materials for the dressing of 18 cases, contrasted with the Regulation Haversack, which can only dress six patients. A letter is attached to the pamphlet in which Colonel C. W. Carr-Calthrop, I.M.S., Principal Medical Officer, Assam, records his opinion of the superiority of this haversack over the present service patterns. As Colonel Carr-Calthrop, I.M.S., was for many years medical storekeeper to Government, his opinion is of special value in this connection. We can congratulate Captain O'Gorman Lalor on this haversack, which we hope soon to see adopted for field service use.

ENTERIC FEVER IN NATIVES OF BURMA.

THE following cases will be interesting to our readers *apropos* of the discussion that has been going on as to the occurrence of enteric fever in natives of India. We are indebted for the notes of the cases to Major G. J. H. Bell, I.M.S., and Captain C. Barry, I.M.S., of Rangoon:—

1. Burman, Prisoner No. 789, aged twenty-five, previous history good: admitted to hospital with shivering, temperature 102°F . evening, morning temperature 99° . Temperature reached 104.6° on 5th January. Complained of pains in chest, breathing hurried, crepitation and friction sounds at bases of both lungs. On 9th January became collapsed and died at 8 P.M. *Post-mortem examination* (11 hours).—Brain unusually congested, right lung in early stage of red hepatisation, spleen slightly enlarged. On opening abdomen yellow coloured matter was found. There were five small ulcers in lower six feet of ileum, one of which had perforated and produced peritonitis, the opening was large. The ulcers are deep and punched out, and situated on Peyer's patches. The solitary glands are enlarged. The patient had been nearly two years in jail and never had been on extra mural labour. Major Bell remarks "the *post-mortem* appearances point to the fever having been of an enteric type, but whether true enteric or not is, I think, doubtful."

Case No. 2—Burman, Prisoner No. 3,749 (Rangoon Jail), aged thirty-seven, in jail six months, employed as an office attendant. Fever began on 9th August 1899, with shivering and evening rise of temperature. Fever continued for 7 days, in evenings about 102° , in mornings 99°F ., bowels regular, and stools normal. Nothing particular was noted till seventh day of illness, when he complained of pain in the abdomen, and of vomiting and flatulence. He became collapsed and died the same evening.

Post-mortem examination (14 hours).—Peritoneum injected, with signs of recent peritonitis, small perforation found in ileum, twelve inches above cæcum. Spleen slightly enlarged, other organs healthy. Ulcers found in ileum, in Peyer's patches, one with pinhole perforation, possibly accidental, but about one foot from cæcum there was a round perforated ulcer. Peyer's patches were more marked than usual.

The following two cases are from the ward^s of the Rangoon General Hospital, one in a Mahomedan and the other in a Burman.

Case No. 3.—Well nourished man admitted with fever and diarrhoea, no shivering, patient looks decidedly ill, is dull and lethargic, tongue dry and coated, bowels constipated after three days' diarrhoea. Pulse 100. Blood examined; no malarial plasmodia. Calomel given and followed by liquid yellow diarrhoea for forty-eight hours. After 7th day patient gradually recovered.

Case No. 4.—Burman Policeman, aged 18, admitted to hospital 30th April, died 6th May 1900. Strong man, history of three days' fever, no shivering, languid and dull, no pain, organs normal; on fifth day motions became loose, pain in abdomen, abdomen distended and tympanic, walls rigid, pulse 130 and small, expression anxious, condition became worse and patient died on 6th May.

The *post-mortem* examination showed general peritonitis, due to perforation of small intestine, several well-marked ulcers, situated in Peyer's patches, one of which was perforated, the others swollen and congested, and "of the appearance met with in typical cases of enteric fever."

Three of these cases are certainly remarkable (we may omit from consideration the third case in the Mahomedan who recovered); in all three the clinical history is much the same.

A few days' feverishness before coming to hospital, an eventless illness for six or seven days, then sudden abdominal symptoms, collapse and rapid death, and on *post-mortem* examination ulceration in Peyer's patches with perforation and peritonitis. What is to be thought of such cases? The death and the occurrence of peritonitis is certainly very early for a case of enteric, as usually seen, but we incline to think that any of our readers who had such a case in his charge would make the same diagnosis as Major Bell and Captain Barry did, *viz*, enteric fever. Tuberculosis is out of the question, common though it is in Burmans, and we have no evidence that there is any other fever which attacks Peyer's patches in this typically enteric fever-like way. We shall be glad if any of our readers in Burma or elsewhere, who may have met similar cases will communicate them to us.

ANKYLOSTOMA IN THE AKOLA JAIL.

THE following is an extract from the report of Major Reilly, I.M.S., on the Jail at Akola for 1899: "There have been two deaths from scurvy, one from chronic diarrhoea and one from acute pleurisy. All these four latter deaths are due, I strongly suspect, to ankylostomiasis, for the prevalence of this disease has been fully demonstrated among the prisoners confined in this Jail. One fact stands forth clear, thanks to Lieutenant Liston, I.M.S., that is, that the disease which has hitherto been returned as scurvy is really non-existent in this Jail, and that all the symptoms present in these cases are, and can be fully accounted for by the presence and activity

of the animal parasite known as the ankylostoma duodenale. About the end of September there were undoubted signs of a recrudescence of the disease known as scurvy, and one important fact may be recorded with regard to it, *viz.*, that as soon as the specific treatment for giving battle to the parasite was pushed, all the patients recovered, one or two being rescued from the grave as it were. There are signs that this Jail is pretty widely affected, and it is necessary to provide us with the necessary plant for discovering and treating prisoners affected with the parasite. In the later and dangerous stages of the disease it can be recognised, but very often it is too late then; whereas with the instruments at hand every infected prisoner could be detected and purged of the parasite before it had worked him serious harm.....It is to be hoped that we are now on the track of the real cause of the sickness in this Jail, which has puzzled us for many years past. The discovery made will explain most conclusively all conflicting points with regard to dietary, surroundings, &c., when the Akola Jail is compared with other institutions of the same kind in this province, and I am not sure whether the *dochmius* will not be forthcoming elsewhere if it is properly sought for."

We are glad to learn that the services of Lieutenant W. Glen Liston, I.M.S., have been applied for to continue this investigation. The question of scurvy in Jails is one which vitally concerns every province in India.

"O SI SIC OMNES."

ONE of the most interesting features in the Report on Inoculation in the Dharwar District, published by Miss Alice M. Cothorn, M.B., B.S., is the description of the extraordinary enthusiasm which attended her inoculation work in the towns of Gadag and Betigere.

Such enthusiasm in favour of inoculation is so rare an event that the following quotation deserves to be reprinted in full:—

Miss Cothorn writes: "I was astounded at my reception. Almost before I was awake in the morning my bungalow was besieged by the better class natives, all eager to make an appointment for inoculation at their own housesnumbers had to be turned away every day from sheer physical inability on my part to get through them. . . . The scenes were indescribable. Four mornings a week I inoculated in two temples in the town. Numbers of adventurous folk clung to the pillars or crowded on the roofs to watch the proceedings; all wanted to be inoculated at once.....the crowd would surge round me, struggling and panting to get in, until I was almost suffocated. The numbers presenting themselves

may be gathered from the fact that on three occasions I inoculated over 900 in a day. In one week I did 4,200 inoculations, an average of 600 a day. One night, as we came out of a house, we were greeted by a roar of triumph and found tables and chairs arranged, and there by the light of two oil lamps and a full moon I inoculated several hundred people, working on till my supply of prophylactic was exhausted."

If inoculation could be attended all over India by such scenes as this, one would have good hopes of soon exterminating the disease, but unfortunately the reverse is the fact.

It is satisfactory to know that when the plague did attack these towns there was a substantial advantage on the side of those inoculated; among the *once* inoculated there was a reduction in morbidity = 66 per cent., and a reduction in mortality = 80 per cent., while among the *twice* inoculated there was a reduction of morbidity = 79 per cent. and of mortality = 86 per cent. Moreover it was felt by all that the epidemic was actually curtailed by these measures, for every thing pointed to a severe epidemic, everywhere rats, squirrels and monkeys were dying of plague (see Miss Cothorn's article, *Indian Medical Gazette*, March 1898).

THE 15TH REPORT OF THE DUFFERIN FUND.

THE present condition of this Fund may be summed up in the words of His Honour the Lieutenant-Governor of Bengal—it is "marking time." The present report though it shows no great extension of the work, at least shows a record of slow and sure expansion, which indicates the stability of the movement.

It has come to be pretty universally recognised that the original dream of getting *purdanashin* women of the higher classes to attend even the splendid and carefully designed hospitals specially built for them has failed of realisation, but it would be a great mistake to suppose that the work of the Countess of Dufferin Fund is so limited or is to be appraised in arithmetical fashion by the numbers of such classes who attend the dispensaries. Hundreds of women who never have and never will cross the door of the hospital are attended by the women doctors, provided by this Fund, with the greatest benefit to themselves. The amount of good work done in this way cannot be reckoned. Therefore, in the words of His Excellency the Viceroy, if the mountain will not come to Mahomet, Mahomet must go to the mountain, that is to say, if the women of India will not come to the Dufferin Hospitals, the nurses and pupils of those hospitals must go to them. It is in this direction, and in the development of the Dufferin Fund as the nucleus of a great training association, that we look

forward to its continued progress and success. As regards the surgical side of the work of the Dufferin Hospitals we are surprised to find so little progress being made. With a few brilliant exceptions, the surgical work of these institutions is very disappointing; indeed from information we have received much stronger language than this might be used to describe this part of the hospital work.

THE PERMANGANATE TREATMENT OF OPIUM POISONING.

THE name of Dr. W. O. Moor has for some years past been associated with the permanganate treatment of cases of opium poisoning. In a brochure we have just received, Dr. Moor claims that the reaction of potassium permanganate or morphine is instantaneous, and morphine is thereby deprived of its toxic qualities and rendered absolutely harmless. It is stated that one grain of permanganate dissolved in one ounce of water is an antidote for one grain of morphine, or for ten grains of crude opium or for one drachm of laudanum or other preparation of opium of the same strength. As it cannot be ascertained at once what quantity of poison a person has taken, the author recommends at once the administration of eight or ten grains of the permanganate in a tumbler of water, and to repeat the dose once or twice at intervals of half an hour. Moreover, as morphine hypodermically administered is excreted by the mucous membrane of the stomach, it is recommended to use the potassium salt also in this form of opium poisoning. The rest of the pamphlet is taken up with extracts of a large number of cases reported in various medical journals which seem to prove the efficacy of this treatment. We are not however much impressed with the cases here reported, and if we remember aright, we believe the method was given a trial in the Medical College Hospital, Calcutta, some years ago, and found of no benefit.

RELAPSING FEVER IN BOMBAY PRISON.

ALL those who have been in Bombay or have read the Bombay newspapers are aware that cases of relapsing fever have been for the past year or so by no means uncommon in that city, but the first account we have come across of the present prevalence of the disease is in an interesting report written by Lieutenant-Colonel G. Waters, I.M.S., of a severe outbreak in the Common Prison, Bombay. We may here briefly summarise this report. In the first half of the year 1899 the health of the prisoners was extremely good, and contrasted in a very marked way with the terrible mortality of the plague-

stricken areas of the city, just outside the prison walls. About the beginning of July, when the plague mortality was at a minimum, the health of the Jail suddenly became worse. Cases occurred among the prisoners of a rapidly fatal fever lasting only a few days, each presenting small glandular swellings in the groins. Much against his will Colonel Waters felt he must recognise the disease as plague. Therefore the cases were sent to Arthur Read Hospital and Dr. Marsh was asked to make a bacteriological examination of them, which he did and found the spirilla of relapsing fever in the blood. These observations were confirmed by Captain G. Lamb, I.M.S., at the Research Laboratory. One curious feature of the outbreak is the exemption of the female prisoners from attack, they are housed in upper stories and seldom work in the Jail yards, they also did not import the disease from outside. One of the most interesting portions of Colonel Waters' report is the description of the glandular enlargements; in the cases there was present a bead-like chain of glands along the groin, along its entire length, the enlargement was uniform and slight, and contrasted considerably with the enlargements of bubonic plague. This appears to be a hitherto undescribed phenomenon in spirillum fever. We have looked through the extremely minute and careful account given by Vandyke Carter, of the symptoms of this disease, as seen by him in Bombay some twenty years ago, and find mention only of inflammation and suppuration in the neighbourhood of the parotid gland, and in serious cases of suppuration of the tonsils and fauces; but he distinctly states that "similar swellings were not noticed of superficial glands elsewhere." The importance of this discovery by Colonel Waters is obvious now that the diagnosis from plague has to be made in any outbreak.

In the month of October the floor and walls of the hard-labour yard were whitewashed (with the reluctant consent of Colonel Waters), and according to the report this damping of the surroundings of the prisoners had an immediate and disastrous effect in increasing the virulence of the disease. The undertrials were suspected of having introduced the disease, and their ward was assumed to be infected and was evacuated with the result that there was a marked decline in the number of cases. The outbreak lasted to the end of February, there being nine deaths from the disease in January and nine in February. Colonel Waters appears to consider that the cause of the outbreak was within the prison, and apparently attributes it to the storage of garden earth and cowdung in the storerooms of the Jail hospital—a very strange place for such materials. This garden manure was finally removed to a

Aitken however just mentions "glandular swellings."

remote part of the Jail compound, and (*post hoc* or *propter hoc*) no cases occurred since some days after the removal of this nuisance. The outbreak is in many respects an interesting one, but with the disease prevalent amid the surrounding population, the introduction of it into Jail and its spread among the inmates of the prison is not difficult to understand, though we are as yet in complete ignorance as to how the spirillum passes from man to man. Major L. Pisani, I.M.S., in his little work on the subject, suggested the intervention of mosquitos or a similar insect agency. We suppose medical workers in Bombay are so busy with the plague that we cannot expect much to be done in the elucidation of this disease, which has many points of likeness to its congeners—plague and typhus; and which, thanks to Vandyke Carter, will ever be associated with medical research in Bombay.

THE SALT RATION IN INDIAN JAIL DIET SCALES.

THE following table shows the considerable differences which exist in the amount of salt in the diet scales for native prisoners in the Jails of seven different provinces of India.

Province.	Quantity of salt in grains.	Quantity of oil in ounces.	Staple food in diet scales.
Bengal ...	330 grs.	$\frac{1}{2}$ oz.	Same salt and oil issue for Bengal (Rice) scale and Bihar (wheat) scales.
N.-W. P. & O.	150 ,	$\frac{1}{3}$ oz. (Just over $\frac{1}{4}$ ch.)	Cereal combination, wheat, <i>bajra</i> , maize, barley, &c.
Assam ...	330 ,,	$\frac{1}{2}$ oz.	Same salt and oil issue, for rice and for wheat &c., scales
Bombay ...	437 ,,	$\frac{1}{4}$ oz.	Wheat, <i>bajra</i> , <i>jowari</i> , &c.
Madras ...	437 ,,	$\frac{1}{4}$ oz.	<i>Raji</i> , <i>cholum</i> , rice for half meal twice weekly, meat or fish for part meal once a week.
Central Provs.	218 ,	$\frac{1}{2}$ oz.	Wheat, gram, <i>jowari</i> , &c. For sickly prisoners' diet double this quantity of salt is given.
Burma ...	218 ,,	$\frac{1}{2}$ oz.	

A POPULAR LECTURE ON PLAGUE PREVENTION.

WE have received a copy of a popular lecture on "The Plague and how to prevent it," which was delivered before the Lucknow "Society for the Diffusion of Knowledge," by Pandit Hori Datt Paul, L.M.S., an Assistant-Surgeon, N.-W. P. and Oudh. We have nothing but praise for this excellent pamphlet, which is full of wise counsel and advice as to the means of fighting the plague. The most important part of the pamphlet is the lecturer's advice to the people.

He tells his audience that the secret of success in stamping out the plague may be summed up in four words, "early detection, complete isolation," but he warns his fellow citizens not to leave this duty to Government, but to do it themselves. "You must convince Government that honest efforts would be made by the people themselves to detect cases of plague and suspected plague at the commencement, and to isolate them according to the rules laid down for the purpose. You should organise volunteer corps for each ward of the city, composed of influential and honest workers, who would make house to house visits, and detect cases at the inception and arrange for their conveyance to special localities provided for the purpose. In a city like Lucknow, with no lack of large empty houses in every ward it would not be difficult to provide places for segregation."

The above extract shows the nature of the pamphlet and the soundness of the advice given therein. The Pundit goes on with pardonable pride to point out that the old Hindu law-givers understood the contagious nature of diseases when they laid down the law that in a household in which a death had occurred the members should not mix with the public for a space of ten days and even then only after they had washed themselves and their clothes. The Pundit concluded his interesting lecture by advising every one to get themselves inoculated and reinoculated, as thereby all danger of infection is considerably minimised.

KASHMIR MISSION HOSPITAL.

THE annual report of the Kashmir Mission Hospital which is managed by Drs. A. and E. F. Neve shows a record of steady progress during the past ten years. In the past year no less than 856 operations for entropion were performed, 240 for pterygium, 93 cataracts were extracted and there were 250 operations for bone disease. The report says: "One of the worst aspects of native surgery in Kashmir is the recklessness with which barbers or *fakirs* stick dirty lancets into large joints. Three amputations had to be performed for septic knee-joints, due to causes of this kind." Three hundred and four tumours were excised, of these 44 were epitheliomata of the skin of the nature described by Dr. Neve in a recent article in these columns. Twenty-four cases of sarcoma were operated on with good results. Hydatids are rare in Kashmir—two, of the liver, were treated by simple aspiration. There were nineteen operations for the radical cure of hernia. Eight vasectomies were performed for prostatic disease with encouraging results. The Leper Hospital is also in a flourishing state, and the number of patients steadily increasing.

The report is extremely satisfactory and clearly shows the amount of good medical and surgical work done by the hospital staff.

THE TRAINING OF CIVIL HOSPITAL ASSISTANTS.

COLONEL J. H. HENDLEY, C.I.E., I.M.S., Inspector-General of Civil Hospitals, Bengal, has made a suggestion, which will, we believe, commend itself to the majority of Civil Surgeons. He proposes that all Civil Hospital Assistants on their first appointment should be attached for a few months to one of the Central Jails, as a supernumerary in addition to the existing medical subordinates. They would thus be able to learn much about their future medical work, and learn methods of treating and diagnosing fever and bowel complaints in a way they never will learn when left to themselves in a small rural dispensary. They will also become acquainted with the practical application of sanitary laws and regulations. This knowledge thus gained will stand them in good stead when afterwards they become deputy superintendents of the numerous subsidiary jails in each district. We look forward with interest to this scheme being carried out.

PLANTAIN FLOUR IN BOWEL COMPLAINTS.

DR. REGINALD ASHE, the Superintendent of the Jail at Mymensingh, has lately used with much success in the treatment of diarrhoea and dysentery flour made from the plantain. He informs us that any variety of plantain will do, but the *kutch kela* (*musa sapientum*) from its size is the best to use. The plantains are cut just before ripening, they are skinned with a sharp wooden knife, so as to avoid blackening, then cut into thin slices, sun-dried, pounded in a mortar and sifted through muslin. The fine powder or flour should be stored in airtight glass bottles. The issue is 2 oz. for each meal cooked in a brass vessel with a little water. *Dahi* or butter-milk can afterwards be added. The taste of the plantain powder is slightly astringent, but fruity and palatable. There is no doubt of the high nutritive value of the plantain. The flour is said to be easily digested. It is well worth trying for patients with chronic bowel complaint who cannot digest milk. A reference to Watt's *Economic Dictionary* (Vol. V, 298) will show that the plantain in many forms has been used in bowel complaints.

MALTA FEVER IN SIMLA.

In our last issue we called attention to the probability of Malta fever existing in India. We have now to report the discovery of a case in Simla. The patient, a European lady, has been

ill with fever, rheumatic pains, and progressive emaciation for several months. Malta fever was suspected and the serum test applied, after Professor Wright's method, with an absolutely positive result. The test was also tried in another doubtful case, but without definite result. In the above case the lady has lived in Calcutta for years and for the past year in Simla. This discovery should encourage others to look out for cases of this fever in India.

DR. J. F. MOLYNEUX in his report on the Health of Chefoo (*Chinese Customs Report for 1900*, p. 30) calls attention to a violent form of disease attended with intestinal hæmorrhage which seems to be called colitis and is said to differ in some respects from dysentery. The stools have a characteristic fetid odour and relapses are very common. The hæmorrhage is a marked feature of the disease, the patients rapidly dying in a cold collapsed state, the amount of the hæmorrhage in many cases being enormous. Dr. Molyneux refers to the outbreak at the Derby Asylum, which we discussed some time ago (*v. supra*, p. 22). Why avoid the word dysentery in such cases? A hæmorrhagic form of dysentery has been frequently described.

In another article, in the same report, Dr. H. J. Hickin discusses the comparative merits of the saline and ipecacuanha treatments of dysentery. He gives a successful case illustrative of each. He tried one grain of cocain instead of laudanum to induce tolerance of the ipecacuanha, but without effect, as for third dose he used 20 m. of laudanum. After this the typical yellow ipecacuanha stool was passed "and the attack was virtually abruptly brought to a conclusion." For certainty and rapidity of action in uncomplicated cases, he believes ipecacuanha easily takes first place, but it always produces terrible nausea and retching, and it requires great resolution on the part of the patient and the doctor to persevere with the drug till the characteristic stool is produced. He points out that the saline treatment, "though not so certain nor so speedy," has the great merit of being far more pleasant. It is remarked that the Chinese tolerate ipecacuanha far better than Europeans.

WE understand that Dr. L. W. Sambon and Dr. G. C. Low (who has recently got the £300 Research Scholarship of the Tropical School in London) were to begin the experiments on the prevention of malaria on 1st June. The mosquito proof house built for the experiment is situated on the railway between Rome and Tivoli in the Campagna.

THOSE who can read French and want a good book on "Diseases of Warm Climates" are recommended to get the volume lately published by Mons. J. Brault, ex-Surgeon-Major of the French Army, and Professor at the Medical College, Algiers. It is a first rate work, well up to date and contains a very full account of all the diseases of the tropics. As our readers know the classic volume of Kelsch and Kiener limited itself to the discussion of the three great diseases of the tropics—dysentery, liver abscess and malaria; but M. Brault's book takes a much wider range, as wide as Manson's *Tropical Diseases*. The chapter on dysentery is particularly good. So is that on paludism. The work of *un médecin de l'armée des Indes* M. Ronald Ross, is fully described. Since Ross' researches, says, M. Brault, the question of the etiology of malaria has taken a practical aspect. The chapters on filarial disease and other parasitic diseases are well done and graphically illustrated. We are also glad to see M. Brault has not been carried away by the wild theory of Dr. Sambon as to the causation of heat-stroke. An account is also given of ergotism, lathyrism, and other diseases still less known such as "atriplicism," "the river fever" of Japan, "Manioc poisoning," "la piedra," "pinta," "crawcraw," "ponos," "Nepal button," "Anakre," genital granuloma," &c.

An account of *kala azar* appears under the heading of *la fièvre noire* and is based upon the reports of Giles and Rogers; even that egregious absurdity *nasha* gets a place; thanks to an account of this form of "cold in the head" having appeared in the transactions of the Indian Medical Congress. On the whole the volume is a good one and we commend it to the attention of our readers. Its publishers are M. M. J. B. Balliere et fils, Boulevard San Germain, Paris, and the price is only ten francs.

DR. RENNIE ROBERTSON in his report on the health of Tientsin (*Chinese Maritime Customs Reports*, 1900, p. 29) remarks as follows:—"The number of cases of malaria have been much fewer than in previous years. This may be accounted for by the improved surroundings of the port, where stagnant ponds and puddles have gradually disappeared, having been filled in. Doubtless many of these puddles were the home and breeding-ground for malaria-bearing mosquitoes. It is worthy of remark that what Surgeon-Major Ross suggested as a possible way of extirpating malaria from certain localities is taking place around our port."

DR. RODERICK J. J. MACDONALD in discussing the question of the endemic home of plague in Yunnan district of China assumes that "there is a harmless variety of the plague bacillus always

present in the soil of endemic areas, such as Yunnan, and that spilled blood and putrid unburied corpses produce virulent cultures. Snakes and rats get infected while living in the ground, and cattle while grazing over it. These animals may give the disease to a family, through the intermediation of biting insects, mosquitoes, or flies, or by eating the flesh of dogs, cats, rats, &c., as the poor do in China."

THERE has been a smart outbreak of cerebro-spinal fever in Dublin in April. The outbreak in the Central Jail, Bhagalpur, lasted some two months, and amounted to about 18 cases with 14 deaths. There is little doubt that the disease is becoming increasingly common.

CAPTAIN J. L. CONDON, I.S.C., writes thus of the measures of success which has attended the fight with plague for the past three years in Bombay.

"In conclusion, a general review of the plague history of this presidency (Bombay) during the last three years tends to show that although the presidency has suffered heavily and that although the pestilence has spread, neither the general incidence of the disease, nor the actual plague mortality (except in certain small places in the rains) will bear comparison with the terrible results, the appalling mortality, accredited to the pestilence in the past, and it may be fairly urged that to the various measures so promptly and thoroughly enforced, and to the loyal efforts made in their introduction.....by a large and devoted body of plague workers.....this moderated virulence—in other words *this success in the fight with plague* is due. (History of Plague in Bombay, p. 15.) Why a medical officer was not told off to write this book is hard to understand. As it is its value is that of a compilation only—admirably compiled be it said.

FROM the commencement of the plague in Bombay, September 1896, till 11th May 1900, there have been in all 392,578 recorded cases of plague, and 308,172 deaths, in the Bombay Presidency alone. Out of this large number there have only been 202 cases and 59 deaths of Europeans in the same presidency.

AN excellently equipped hospital for Europeans has recently been opened at Port Blair, thanks to the exertions of Major H. Hudson, I.M.S., the Senior Medical Officer there. The want of a suitable hospital for the European community of those islands has long been felt.

IN our last issue we commented upon the curative value of Lustig's serum for plague,

basing our remarks on Dr. Polverini's report. We have now before us a reprint of a lecture by Dr. A. Mayr, of the Municipal Laboratory, Parel, which goes over the same ground. As we said before the use of Lustig's serum is decidedly a hopeful method of treatment, and we hope to see it used on a much more extended scale.

It is often extraordinary to see what statements are allowed to pass without protest in matters medical. At a recent meeting of the British Climatological Society Dr. Lang Gordon stated that the "*malarial parasite was found on the ground and in the grass*" in Southern Rhodesia. This remark evidently refers to an absurd statement which we criticised some months ago. It is obviously absurd and without foundation, yet we find men like Dr. A. P. Hillier pass it over without criticism. We need not be enamoured of the mosquito theory to see the absurdity of the view put forward by Dr. Gordon.

AN unusually bad type of malarial fever has prevailed in many districts of eastern Bengal during the past year, more especially in Rangpur Faridpur, and Pubna. In one district no less than 82 per cent. of prisoners newly admitted to jail had enlarged spleens. Needless to say in these districts a bad type of dysentery was also rife.

AS announced in our last issue, we propose to issue a special *stone* number of the *Indian Medical Gazette* in lieu of our usual issue for August. We have received many admirable papers dealing with calculus disease, and the various operations for stone in the bladder, and we have every hope that our readers will be well satisfied with the special number, and that it will worthily represent Indian surgery in these special operations.

Reviews.

Heart Disease with special reference to Prognosis and Treatment.—By SIR WILLIAM H. BROADBENT and JOHN F. H. BROADBENT. Baillière Tindall & Co.

A BOOK already in its third edition may be said to have received the *imprimatur* of public opinion, and Sir William Broadbent's work has reached and must have influenced a wider public than his old students to whom he dedicates it. In its original issue the book was, we assume, practically a reprint of his lectures before the Harveian Society in 1884, and before the College of Physicians in 1891; but it has grown as such books are apt to grow under appreciation, until in the present edition it

appears as a treatise on disease of the heart, a result which is due to the able assistance of Dr. John Broadbent. It is a clinical and practical treatise, a plain tale ungarnished with theoretical lore, and we do not know of any other which within 400 octavo pages brings as vividly before one the forms and phases of *morbus cordis*.

The book is meant for practitioners and advanced students, and the author has happily preserved the original character of his lectures, assuming a knowledge of cardiac anatomy and physiology over which the writers of weighty volumes spend many chapters, and so there is the more room for the discussion of symptoms, prognosis and treatment. We venture to think that in no recent English work on medicine outside neurology has pathology—we do not mean pathological anatomy—been more wisely or efficiently used to account for symptoms, to base prognosis and to guide treatment. They follow naturally as it were; and this is what to our mind constitutes the signal merit of the book. All parts of it however are not of equal merit, nor was it to be expected that the later additions would be equal to the ripe work of Sir William Broadbent from whom, for example, we should have expected the courage to omit a description of the types of ulceration, endocarditis, which it is protested should be placed among the complications of septicæmia: nor are we able in this connection to understand the statement that granulation tissue in vegetations is developed "by proliferation of *endothelial cells*." One does not expect small flaws such as this in the work of a master.

So much has been claimed in recent years for the many new cardiac tonics that we are glad of the weight of the author's opinion in favour of digitalis, which is so often used unintelligently. The indications are so precisely given and the reasons for its use so clearly argued as to disarm prejudice on the one hand and to control recklessness on the other.

Considering the importance and frequency of pericarditis it receives but scant attention, and we must demur at the way in which friction murmurs are dismissed as being "completely different in character" from endocardial murmurs, a statement which does not represent fact in this country at any rate. Conjectural explanations occur here and there, which are unworthy of a place in a book so essentially practical. In cardiac hypertrophy, for example, it is alleged that the first sound is less distinct because "either the mass of muscle contracts less simultaneously or the *thickness of the necks masks the sound*." The alternative seems unintelligible. The aortic second sound it has already been explained is conducted to the apex by the heart muscle, and it is usually louder

than normal in hypertrophy. If then the muscle conducts the sound caused by sudden tension of the aorta and its valves, it is not easy to understand why it should mask "the sound produced by the sudden tension of the valves and tendinous cords" in the ventricle itself.

In the chapter on angina nothing is added to our knowledge, nor can the discussion of its pathology be considered profitable which ends in the conclusion that angina is "one of the defensive arrangements by which the adjustment of internal reaction to external conditions is secured;" but the remarks on spurious angina due to distension of the stomach with high arterial tension are worthy of careful attention. And this leads us to remark on the boldness born of long experience, with which the free use of vaso-dilators is recommended under suitable conditions, the same remark being applicable to the use of calomel and of blood letting either by venesection or by leeches.

The nucleus of this book and its most valuable part is what must have been the original lectures founded on a wealth of clinical observation and accurate reasoning that command respect; but the whole treatise is illumined by a radiant common sense and its language is so vigorous and clear that there can be no doubt of its retaining the position it has already secured among the best that has been written on cardiac disease.

Anæsthetics, their Uses and Administration.

—By D. W. Buxton, M.D., B.S. 3rd Edition, 1900.
H. K. Lewis, London.

ALTHOUGH no amount of book lore will make a good and safe practical anæsthetist, yet a book written by one who is, may be an instructive guide, as in this case.

The bulk of the book is naturally devoted to chloroform, ether and nitrous oxide gas. There are other chapters on the less commonly used anæsthetics—amylene, penthal, ethidene chloride and hydrobromic ether; on various mixtures, such as the A. C. E., that of Vienna, of Billroth, methylene, &c.; on local anæsthesia, on anæsthetics in special surgery and obstetrics, on the accidents and complications that may occur, and on the medico-legal aspects of the administration of anæsthetics.

Some of the illustrations seem superfluous, e.g., that of a mouth spoon invented by the author to catch teeth or roots that may fall out of the grip of forceps, the "Hyderabad cone," &c., indeed, one section of the book resembles an instrument maker's catalogue.

The historical sketch of anæsthetics ranges from the times of the ancient Egyptians, Assyrians and Arabians, down to the investigations of the Hyderabad Chloroform Commission, and those carried on under the auspices of the *Lancet* and the British Medical Association.

The recommendations given in the section on the choice of an anæsthetic overlap, and do not always agree with those prescribed in the directions laid down for special and obstetric surgery.

In the chapter on Nitrous Oxide Gas a good description is given of its administration by itself, with admixture of air or of oxygen, and combined with ether.

The author is sceptical as to whether any of the fatalities imputed to nitrous oxide inhalation were really due to its direct physiological action. In some instances the cause was pain syncope during insufficient narcosis, and in others laryngeal spasm from the slipping of the gag.

Dr. Buxton has a predilection for ether and enters very fully into its merits and methods of administration. Amongst the latter he advocates the use of oxygen along with ether in cases of difficulty from dyspnoea, spasm, cough, holding of the breath, struggling with cyanosis, for alcoholics and people of feeble vitality. The addition of oxygen removes difficulties, and the resulting narcosis is stated to be more profound.

Dr. Buxton also recommends rectal etherisation, a method which he has used extensively and has found specially useful for operations about the face, mouth, nose and post-buccal cavities, for intra and extra-laryngeal operations, for staphylorraphy and for operations connected with empyema. Ether given per rectum takes longer to induce unconsciousness and more of it is required. To nullify this disadvantage he first gives chloroform or ether in the ordinary way, and then maintains anæsthesia by ether per rectum.

The author discusses the various views of chloroform anæsthesia in vogue, and he favours the possibility of primary heart failure in any of the stages or degrees of narcosis, and as arising independently of respiratory difficulties. The following extract is given *in extenso*, because it emphasises the most important practical factor in chloroform administration.

"Snow found further that calculating the weight of the blood as thirty pounds, twelve minims of chloroform in the circulation produce narcosis of the second degree; eighteen minims the third degree (surgical anæsthesia); twenty-four deep narcosis (fourth degree); and thirty-six paralyse the medullary centres. In practice more is needed because a certain proportion evaporates from the tracheal and bronchial surfaces and is carried out in expiration. If twelve minims be evaporated into a bladder and inhaled to and fro, no more air being allowed than can be blown through the lungs, narcosis of the second degree actually results. Now, taking thirty-six minims as a lethal dose, the following considerations, upon which Snow strongly insisted, explain how easily this quantity may enter the circulation if the administrator be not per-

petually upon his guard against over-dosage; eighteen minims represent the amount absorbed to produce surgical narcosis, this amount might be absorbed by the use of thirty-six minims, the remaining eighteen minims being exhaled as above mentioned. These thirty-six minims represent 37.5 cubic inches of vapour, which at 60° F. would require 257 cubic inches of air. The 300 cubic inches thus formed would be inspired in twelve respiratory acts (25 cubic inches being the amount of tidal air). Now, if a vapour of this strength were continuously inhaled, the residual and complemental air would become saturated, and as about 250 cubic inches represent the air in the lungs, this amount would at 60° F. contain the vapour of thirty minims. Assuming only half this quantity to be absorbed, that is, fifteen minims, we should then have 18+15 or 33 minims in the blood, an amount almost if not quite enough to paralyse the respiratory centre. These points being held in remembrance will explain many cases of chloroform death, ascribed to 'idiosyncrasy' or the 'fatty heart' which stands in expert chloroformists in such good stead. These considerations, which cannot be studied too carefully, point out the importance of both avoiding an over-dose of chloroform, and of maintaining a due elimination of the drug.

"Broadly speaking, it is true to say that a dose of chloroform which is safe, provided due air exchange is ensured, rapidly grows dangerous when its elimination is interfered with. It is thus evidently a fallacy to urge that if only a small quantity of chloroform is given the patient is free from danger. The peril lies not in the quantity of chloroform inspired when breathing remains unimpeded, but in the strength of the vapour entering the lungs."

Imperative Surgery.—By HOWARD LILIENTHAL, M.D. MACMILLAN & Co, London and New York. Price 17s.

It would seem somewhat useless to say of a book when printed and in circulation that it need never have been written. True, however, is the statement of this and many other very excellent works. There are quite enough works on surgery, and, unless for some specific purpose, surgeons may give their pens a well-earned rest. This is not all blame, far from it, for Dr. Lilienthal's heavy handsome volume is welcome if not necessary, and will be an addition to the surgeon's library. From the *Preface* we gather that the book has been written for the "practitioner of medicine who rarely takes up the scalpel, the specialist whose path seldom leads him to the operating room, and the recent graduate who, though versed in the lore of the books and lectures, has seen but little surgery at close range." It is suggested, if not distinctly admitted, that this book is to help a man in an emergency, when he is left entirely to his

own resources. It is just the book, however, that the general practitioner and his other companions of the preface would not have in their pockets at the time. Further, the book is by no means what it pretends to be. I quote again from the *Preface*:—"It deals *only* with the diagnosis and treatment of conditions which demand immediate operative measures." It does so, it is true, but not *only*. If the book was what it pretends to be, it might be a handy and useful companion. What *emergency* can there be about the question of operating for circumcision, for retention of septic matter within the uterine cavity, or on boils; or can it be pleaded that operations for uniting portions of a fractured patella come under the 'heading' of "*Imperative Surgery*." As a matter of fact, Dr. Lilienthal has done his best to write a work on operative surgery and he has produced a good book, but not such a book as one expects to find under the title of *Imperative Surgery*. The illustrations are very good indeed and the work is excellently got up.

Manual of Diseases of Women and Uterine Therapeutics.—By H. MACNAUGHTON JONES, M.D. Eighth Edition, revised and enlarged. London: BALLIERE TINDALL and Cox, 1900.

THIS is a completely new and almost entirely re-written edition of a volume which, in its earlier editions, was a great favourite with all classes of students and practitioners. It is now a large and handsome volume which is sure to be more popular than ever. When we compare it with the first edition of the book, which we have had by us for many a year, we are at once struck with the great progress which has been made in the study of the diseases of women.

The book is certainly what it claims to be—a thoroughly practical manual of the subjects it purports to treat of. It is very copiously illustrated, there being no less than 635 illustrations and 28 plates. In such a volume it is difficult to pick out individual chapters for special commendation, but in reading the volume we were much struck with the one on asepsis and antisepsis in gynaecological surgery, which is so practical that it deserves careful study. The chapters on tubal pregnancy and on ovarian cysts are also particularly good. Full use has been made of what is perhaps the best book printed on operative gynaecology, that of Howard Kelly. In conclusion we have nothing but praise for this excellent volume which we can heartily recommend to our readers as one of the most useful and practical volumes on the subject of the diseases of women which we have ever come across.

A Pocket Medical Dictionary.—By G. M. GOULD, M.D. Fourth Edition, revised and enlarged. London: H. K. LEWIS, 1900. Price 5s. nett.

THIS very admirable little book is one which is strongly to be recommended, and should be

in the possession of every medical man. In short compass it explains the pronunciation and meaning of no less than 30,000 medical words. In addition it has a very complete table of eponymic terms, which are often used, but not always remembered. This section we have tested and found it unfailing and accurate, *e. g.*, if we want to know what "Corrigan's disease" is or Cooper's fascia or Prevost's symptom, Plummer's pill or Profeta's law, Trapp's formula or Tait's law, Koplic's spots or Kernig's symptom, we find them all explained briefly and clearly in this little book.

Another valuable section is the list of tests; here we find innumerable chemical and clinical tests which one is very apt to forget. There is also a very complete table of doses and complete tables of weights and measures. In the dictionary proper part there is even a table of micrococci, giving the primary characters of each and where they are to be found, also a table of muscles with origin insertion, nerve supply and function of each.

The reader will find on glancing through the pages hundreds of medical and other scientific terms which would puzzle him to give the meaning of.

The little book is most elegantly bound and got up with gilt edges and limp morocco binding that make it a pleasure to handle. In India, the land of transfers, where a big medical library is an impossibility, such an elegant little book like this is to be recommended, and we are sure that none of our readers who purchase the book will have any cause to be disappointed.

Current Literature.

MEDICINE.

The Typhoid Bacillus and Typhoid Fever.

—By P. Horton-Smith, M.D., F.R.C.P. (*The Lancet*, March, 24-31, 1900.)—Though the bacillus typhosus can be readily differentiated from the bacillus communis coli, yet it is by no means a simple matter to diagnose the former, because they both belong to the large bacillus coli family, of which there are numerous intermediate forms which resemble the one or the other in various tests and reactions. In fact no test is absolutely specific, except that of Pfeiffer, which is often difficult to demonstrate; consequently reliance must be put on a series of tests which are long and tedious. These are:—(1) morphology and motility (as observed on gelatin); (2) flagella; (3) gelatin and agar slope culture; (4) dextrose-agar or gelatin shake cultures, preferably the former; (5) litmus milk (one month); (6) broth culture (no indol—one month); (7) Proskauer and Capaldi Medium No. 1 (no growth 48 hours); Proskauer and Capaldi Medium No. 2 (growth and acidity 48 hours); (9) agglutination test (high dilutions—1 in 1,000 at least—agar cultures); and (10) in cases of doubt Pfeiffer's test. The last two are by far the most important.

The life-history of the bacillus typhosus may be considered: (a) in its relation to the human body and (b) in its existence outside the body. Of the latter there is little known, and that is conflicting; but so far it has

not been demonstrated that this bacillus can multiply outside the human body. Whereas, in favour of its active saprophytic growth, it has been fully proved that a person may, though apparently recovered, remain infectious for months and even years after an attack of typhoid fever. The bacillus also has a great power of resisting the effects of desiccation, and may remain alive for over a year in the dry state. Both these facts may help to afford a satisfactory explanation of epidemic outbreaks otherwise obscure in their origin without having recourse to a theory of actual growth of the bacillus outside the human body.

The toxins of the bacillus typhosus are chiefly intracellular, being contained in the bacillary body and passing but slightly into the surrounding medium during its lifetime, and being set free on the death of the bacillus. Clinically this is of interest as helping to show why an immediate fall of temperature need not be expected when a patient suffering from typhoid fever has acquired sufficient bacteriolytic power to destroy the bacilli; in short, to explain the fall by lysis which is so typical of the disease.

A toxine is comparatively a feeble one, consequently the bacilli must be present in great numbers, spread over many organs and in diverse situations, to explain the symptoms of the disease, and this is what we find, because the specific bacilli occur with great constancy in Peyer's patches, in the solitary follicles, in the mesenteric glands, in the spleen, with great frequency in the red marrow and in the spleen, not uncommonly in the kidney, sometimes in the lung, and even in other organs such as the testis.

In fatal cases typhoid bacilli are not infrequently found in the blood; but in non-fatal cases most observers have experienced great difficulty in demonstrating their presence in the circulation. But immediate and considerable dilution of the blood, to diminish its bactericidal power, has made it possible in a considerable percentage of cases to obtain the bacillus from the blood during life. The probable explanation is that living blood is a bad medium for their growth, and hence the bacilli seek shelter in some of the viscera. It is in the fatal cases that the blood fails to retain its bactericidal property, and hence in them the typhoid bacilli develop and are found in considerable numbers in the blood after death.

The presence of typhoid bacilli in the roseolous "spots" in the skin has been clearly demonstrated, and this further emphasises the general distribution of the bacillus, and also the fact that typhoid fever is not merely an intestinal disease.

It has not been definitely proved that the bacillus typhosus occurs in the sweat; but Dr. Horton-Smith has shewn that it may occur in the lung in large numbers, and in these cases (fortunately rare) it is probably contained in the sputum. This suggests the practical point of disinfection of the sputa in a case of enteric fever with lung symptoms as a precaution against the spread of the disease. The contagiousness of typhoid feces has been generally accepted since the days of Budd of Bristol. But the recent progress of bacteriology has made it evident that frequently the bacillus coli communis or one of its numerous varieties has been mistaken for the specific organism. It is practically certain, however, that the stools are markedly infectious during the first two weeks of a case of typhoid fever; but at later periods, and during convalescence, it is very difficult to isolate the microbe if care be taken to obtain fecal matter uncontaminated with urine. Typhoid bacilli may sometimes be found during the early part of the third week, and possibly also during the early part of a relapse.

The urine, on the other hand, only becomes dangerous in one out of every four cases, and then only towards the end of the attack or during convalescence. But when the bacillus typhosus occurs in the urine it is always easy to find it, because it usually occurs in pure culture and frequently in quite phenomenal numbers.

The conclusion that the writer adopts, after a consideration of the data above-mentioned, is as follows:—

"Any conception of the disease which regards it merely as affecting the alimentary canal only can no longer be maintained. On the contrary, so far from considering it as an intestinal disease pure and simple, we should rather look upon it as a *modified form of septicæmia*. It is septicæmia in that always and in all cases the bacilli pass into the blood and then into the various organs, and in that the symptoms, excepting in as far as they are intestinal, are referable to the poisons there produced. It is a modified form, however, in that in nearly all cases there is a definite local and primary disease whence the secondary dissemination of the micro-organism takes place. Looked at in this way we have a ready explanation of the fact that the severity of the disease bears no relation to the number and character of the intestinal lesions. For just as a fatal septicæmia may originate in a scratch, so one or two small typhoid ulcers may be quite sufficient to allow the entry of the micro-organism and the development of the disease."

A relapse is simply a complete renewal of the primary disease, the same cycle of events is experienced—often in a milder form, though not always so. The toxins of certain normal intestinal bacilli assist the growth and spread of the B. typhosus, and allow of its rapid growth and increased virulence by decreasing the resisting power of the sufferer. Such bacilli are the B. coli, the B. proteus vulgaris, and the streptococcus pyogenes aureus. When the toxins of these other organisms are absorbed towards the end of an attack, then the immunising effects of the primary typhoid attack are minimised, and the typhoid bacilli regain fresh virulence. In other words, auto-intoxication is a most important factor in the etiology of relapses. Hence the practical wisdom of antiseptic treatment and of strictly forbidding solid food for a good while after the temperature is normal.

E. M. MOIR.

Correspondence.

THE HOMŒOPATHIC MEDICAL SCHOOL.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

DEAR SIR,—I enclose a 'cutting' from the *Statesman* of June 1st. I have no doubt that Lieutenant-Colonel K. P. Gupta's lecture on the "Sanitary (should it not be insanitary?) condition of Bengal" will be both instructive and useful. Sanitation too is much the same for all sects of medical practitioners, so no fault can be found on the score of the subject chosen. The I.M.S., however, is not worked on *homœopathic* lines and a conscientious homœopath is a man for whom I cannot feel any respect at all. The absurdity of the doctrine when carried to its logical conclusion has been laid bare again and again, and I do not think it is at all becoming for Lieutenant-Colonel K. P. Gupta, I.M.S., to encourage the "Homœopathic Medical School." By what right does the "Homœopathic Medical School" hold examinations and grant diplomas and degrees?

Yours, &c.,
F. L. S.

"HOMŒOPATHIC MEDICAL SCHOOL.—This school has passed twenty-three Licentiates and a Bachelor in Medicine and Surgery. The classes open on June 15th, and the inaugural address on 'prevention of diseases, with special reference to the sanitary condition of Bengal' will be delivered by Colonel K. P. GUPTA, I.M.S.—*Statesman*, 1st June 1900."

[We should say the so-called school had no right at all to grant diplomas, and it is certainly not at all right for an L.R.C.P. and L.R.C.S. of Edinburgh to preside at the meeting of such a school—Ed., I.M.G.]

FILARIAL METAMORPHOSIS IN THE ANOPHELES.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—Since I sent you off my article on filarial metamorphosis in the anopheles genus of mosquito (*Indian Medical Gazette*, May, 1900). I have again worked out the metamorphosis in two batches

of anopheles with the same results, but with the important addition that I have found the final stage of the filaria in the head and *actually partly within the proboscis* of the mosquito. I am, therefore, now of opinion that infection during the act of "biting" is the most probable way. My paper, with details, is being sent to the B. M. Association Meeting at Ipswich.

Yours, &c.,

S. P. JAMES,
Capt., I.M.S.

QUILON

30th May 1900.

A GARBLED QUOTATION.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—In your issue for March, 1900, page 95, Colonel Lawrie, I.M.S., writes as follows:—

"While the microscope possesses a certain scientific value in malaria, which is still indefinite, there is no doubt that it has acquired a very distinct commercial value in the profession; indeed Ross has gone so far as to state that 'the success of Imperialism in the coming century will depend largely on the microscope in malaria,' notwithstanding that the science of malarial parasitology has been proved to be founded almost exclusively on assumption and not on fact."

In a footnote, Colonel Lawrie gives the *Times*, Tuesday, November 28th, 1899, page 11, as his authority for the above quotation from my lecture to the Liverpool Chamber of Commerce. I now enclose an extract from the *Times* to which Colonel Lawrie refers—the extract having been sent to me by the General Press Cutting Association. I also enclose a cutting from the *Liverpool Courier* for Tuesday, November 28th, giving my lecture in full. From both of these it will be seen that Colonel Lawrie has altered the passage which he quotes from my lecture. What the *Times* actually wrote was that, "He (i.e., myself) believed that in the coming century the success of Imperialism would depend largely upon success with the microscope"—meaning, of course, on the microscopic investigation of disease. The *Liverpool Courier* gives the same passage in my own words. In neither paper do we find the smallest justification for the addition of the two words "in malaria" which some one—I presume Colonel Lawrie—has thought fit to append to my utterance; there is no justification for them, either in my words themselves or in the context. The words could scarcely, I think, have been inserted by accident. I must assume then that they were put in, partly in order to make me out as having been the author of a ridiculous statement (namely, that Imperialism will depend on the microscope in malaria—that is, in the diagnosis of malaria!) and partly in support of Colonel Lawrie's previous sentence which means—if it means anything—that the profession uses the microscope in malaria for commercial purposes—a delicate innuendo which will scarcely escape the reader.

I shall be much obliged if you will kindly publish this letter and endorse the correctness of my quotation from the *Times*.

Yours faithfully,

RONALD ROSS, D.P.H., M.R.C.S.

SCHOOL OF TROPICAL MEDICINE,

THOMPSON-YATES LABORATORY,

UNIVERSITY COLLEGE,

LIVERPOOL.

20th May 1900.

[Dr. Ross's statement is correct, the words "in malaria" are not found in the article in the *Times* of November 28th.—Ed., I.M.G.]

THE VALUE OF "SAGS" AS ANTISCORBUTICS IN THE JAIL DIETARY.

To the Editor of the "INDIAN MEDICAL GAZETTE."

SIR,—In response to the invitation made by you in a footnote to Captain Jennings' letter in the June number of the *Indian Medical Gazette* asking for an expression of opinion by Medical Officers of Jails on the desirability of banishing "sags" from the Jail dietary, I should like to say that my opinion agrees with Captain Jennings so far as regards some of the better classes of indigenous vegetables of this nature.

"Cholai" sag referred to by him appears to be the name in use in the North-West Provinces for the *Amaranthus Anardana*, an ally of the *Amaranthus Gangeticus*, Linn., which is known in Chota Nagpur by the Santali name "Gandhari sag" and more s "Lal sag." This I consider the best of long way but another commonly grown, the "sag" (*Beta Bengalensis*) is also good. There are other similar vegetables appreciated by the better class natives but for various reasons are unsuitable for growth in Jail gardens. These two sags will grow at nearly all times of the

year in the Hazaribagh district where European vegetables are unobtainable, and I think most Europeans at those time of the year occasionally eat and enjoy them. They cook very well and suit very well prisoners with a tendency to bowel disorders. Although I prefer to give to weakly prisoners mixtures of potatoes, onions, beet-root, etc., during the hot weather, yet I cannot think that *sags* of the above kinds are without antiscorbutic qualities, sufficient to warrant their general use with the ordinary classes of prisoners.

The dispute into which this class of vegetable has fallen is due to the use of the leaves of a great variety of plants grown for other purposes, particularly the leaves of cucurbitaceous plants grown for their gourds and the leaves of potatoes, gram, etc. Many jailors are in the habit of making use of these articles to make up the required ration in times of difficulties. I consider the condemnation of such *sags* to be most proper.

With regard to the method of cooking, Captain Jennings says that in jails it is impossible to cook *sags* without using a large quantity of water and straining. In the Hazaribagh Central Jail, and I believe generally in Bengal Jails, it is usual to cook all classes of vegetables with the exception of potatoes with the addition of but a very small quantity of water which is not thrown away. There appears to be no difficulty in doing this in large iron cooking vessels, the vegetable is cut up into small pieces and piled up in the cooking vessel, water is added only in sufficient quantity to prevent burning at the bottom; the water in the vegetables is sufficient to cook them well.

Experience in a question of this kind is no doubt apt to be fallacious as probably nowhere are these vegetables at all exclusively used. An analysis of the salts might throw more light on this subject, but I do not think the process described in Captain Jennings' letter is a sound one. It in no way determines the presence of the organic salts which are generally believed to be the constituent of vegetables which gives them their antiscorbutic value for in the method described by him the salts found might have been almost exclusively lime and silica or inorganic soluble salts in their original form in the uncooked vegetable.

I am, etc.,

A. H. NOTT,

Major, I. M. S.

HAZARIBAGH,)
June 9th, 1900.)

THE ASSAM AND CENTRAL PROVINCES ASYLUM REPORTS.

THERE is only one asylum in Assam, at Tezpur; this was in charge of Major E. A. W. Hall, I.M.S., for the last nine months of the year 1899. There is accommodation for 90 males and 30 females, there is also separate accommodation for 28 criminal lunatics, but there was overcrowding on several occasions, and the building will have to be enlarged. There is no satisfactory hospital for male lunatics, but a house to accommodate four female patients is being built. There were 22 lunatics only admitted during the year. The average daily strength of lunatics confined in the Province was 126, which is higher than the ten year average 107. During the year 18 lunatics were discharged as cured. It appears that imported coolies make up a considerable share of the total lunatics in Assam, viz., 7 out of 22 admitted during the year. Of the criminal lunatics confined during the year (37 in all), 30 were committed for assaults against the person (murder, grievous hurt, &c.). Only one prisoner in jail became insane and was removed to the asylum. The admissions are thus classified, mania 13, melancholia 8, idiocy 1, total 22. The causes assigned for the insanity were in 11 cases unknown; in 11, death of children (grief) 1, *ganja* smoking 5, epilepsy 2, pneumonia 1, syphilis 1, heredity 1. (Total 11.) The admission to hospital *per cent.* was 67, and the death-rate 7.1 *per cent.*, which, however, is lower than the decennial average.

Major Hall gives tables for past four years which show a very satisfactory and substantial reduction in the number of admissions to hospital during the months, May to November, in the past three years during which the prophylactic issue of quinine was in force.

Of the 9 deaths during the year 2 were due to dysentery, 4 to "anemia (due to ague)" and 1 due to cancer of stomach, to phthisis and to diarrhoea. Books, papers, magic lantern exhibitions, &c., were provided for the lunatics during the year. It is proposed to start a dairy—but owing to prevalence of cattle disease this had to be abandoned.

In the two asylums in the Central Provinces there were in all 395 lunatics, 208 at Nagpur and 187 at Jubbulpur. The percentage of cured to daily average strength was 12.9 at Jubbulpur and 6.36 at Nagpur. The health of both asylums improved during the year, the death-rate percent in Jubbulpur was only 1.9 compared with 4.5 in the previous year, and at Nagpur 6.3 against 10.4. Of the 69 admissions, 33 are ascribed to physical causes (15 to preparations of cannabis indica, 3 to spirit drinking, 5 to epilepsy, and 5 to heredity). There were thirteen cases ascribed to moral causes as religion, grief, domestic trouble, &c. In twenty-three cases the cause was unknown. Major Silcock

comments upon the difficulty of getting satisfactory information in such cases. The following is a classification of the types of insanity of the total population of both asylums:—idiocy, 24, mania, epileptic, 23, other forms, 179; melancholia, epileptic, 1, other forms, 25; dementia, epileptic, 1, other forms, 84; delusional insanity, 3. There were no cases of general paralysis. There was an outbreak of influenza in the Nagpur Asylum, which led to 129 admissions to hospital. In Nagpur there was no prophylactic issue of quinine, but cinchonide was issued daily in 2 gr. doses in Jubbulpur from May to November. One lunatic murdered another in Jubbulpur, both were criminal lunatics. In the Jubbulpur Asylum a musical band was got up among the inmates, which was much appreciated.

The Chief Commissioner and the Administrative Medical Officer both state that the asylums were managed to their entire satisfaction by Lieutenant-Colonel H. K. McKay, I.M.S., C.I.E. (and in his absence by Lieutenant-Colonel W. A. Quayle, I.M.S.), and by Major Silcock, I.M.S.

Service Notes.

It is with much regret that we have to chronicle the sudden death, from cholera, at Mount Abu, of Lieutenant-Colonel Archibald Adams, I.M.S., the Administrative Medical Officer of Rajputana, at the early age of 49 years. He became a Lieutenant-Colonel, I.M.S., in 1895. He had served in Rajputana for eighteen years. It was only a few months ago that we reviewed most favourably his *Medico topographical Account of the Rajputana States*, which will remain for long as a monument of his work in and for the States of Western Rajputana. He also served in the Ashanti War of 1873-74.

LIEUTENANT C. J. O'GORMAN, R.A.M.C., is mentioned in Colonel Kekewich's despatches for good work done during the siege of Kimberley.

WE regret that Lieutenant-Colonel Russell, I.M.S., Professor of Materia Medica, Medical College, Calcutta, has had to go home on sick leave. Lieutenant-Colonel G. H. Harris, I.M.S., on return from privilege leave, acts in the appointment.

CAPTAIN H. ESMONDE DOWSE, R.A.M.C., died at Bloomfontein on 5th May from enteric fever.

MORE nominations for vacancies in the R.A.M.C. are announced. If this sort of method of getting together medical officers continues, the examinations might as well be abolished.

DR. JOHN WYLLIE has been appointed Professor of Medicine in the Edinburgh University in place of the late Sir T. Grainger Stewart.

It is stated that Mr. Frederick Treves, now that he has returned from the War, will probably retire from active practice and seek to enter Parliament.

THE *Medical Review* (formerly the *Medical and Surgical Review*) devotes some four and a half columns of editorial space to an appreciative discussion of the article on "Heat Apoplexy in the Army" by Lieutenant-Colonel C. J. McCartie, I.M.S., which appeared in our columns in June 1899. The writer is entirely opposed to Dr. Sambon's fantastic microbic theory. The article concludes—"By diverting attention from the means by which siriasis may, to a great extent, be prevented in the army, and by which many valuable lives may be saved, the infectious theory is calculated to do a great deal of harm."

WE learn from an article by Dr. W. H. Gilbert in the *Medical Press* (May 2nd) that the Grand Ducal Government of Baden-Baden is making great reduction in the prices of all their hydrotherapeutic procedures, baths, &c., for officers and soldiers wounded in South Africa. After the Franco-German War of 1871 there were several hundred sick and wounded from the war treated at Baden-Baden with excellent results. The usual time necessary for the 'cure,' which of course depends upon the disease, is from five to six weeks.

ALL men belonging to the Medical Service of the German Army are required, by a recent regulation, to be able to ride a bicycle

THE following list of medical officers of the Bengal Establishment who fell during the Mutiny (1857-8) is taken from an old volume of *Indian Annals of Medical Science* for year 1858:—

1. Senior Surgeon James Graham, murdered at Sealkote by men of 9th Cavalry while attempting to escape in his trap, accompanied by his daughter, who was spared and drove on carrying her father's dead body in the trap.
2. Christopher Gorhett, Superintending Surgeon at Cawnpore, died of fever in the trenches with the troops under Sir Hugh Wheler.
3. Surgeon J. Bannatyne MacDonald, of 41st Regiment N. I., escaped to Lucknow and died of cholera there.
4. Surgeon H. H. Bowling, 28th Regiment N. I., murdered at Shahjehanpore with all the officers of this regiment while at church; sepoys surrounded and shot them down.
5. Surgeon Kinlock W. Kirk, Superintending Surgeon, Gwalior Contingent, shot on 14th June in the presence of his wife. He was the author of the "Medical Topography of Upper Scinde."
6. Surgeon Nathaniel Collyer, 53rd N. I., died of fever, in the trenches at Cawnpore.
7. Surgeon William R. Boyes, 2nd L. Cavalry, perished with all his family "in the bloody massacre at Cawnpore."
8. Surgeon A. W. R. Newenham, 1st N. I., perished with his wife and three children in the massacre at Cawnpore.
9. Surgeon Thomas C. Heathcote, 10th N. I., escaped from Futtehgarh, and perished at Cawnpore with his whole family in the attack on the boats.
10. Assistant-Surgeon J. M. Hay, Civil Surgeon of Bareilly, murdered at Bareilly.
11. Assistant-Surgeon S. Maltby, killed in the attack on the boats at Cawnpore.
12. Assistant-Surgeon John Colin Graham, Medical Store-keeper, Sialkot, murdered by the 9th Cavalry; his wife was spared.
13. Thomas Mawe escaped from the massacre at Jhansi, and perished of fatigue and exposure.
14. Hartwell S. Garner, 12th L. Cavalry, murdered with his wife by troopers of his own regiment; one child saved by an ayah.
15. R. D. Dove Allan, perished in Cawnpore massacre with his wife and child.
16. W. B. McEgan, 14th Cavalry, massacred with his wife at Jhansi.
17. Thomas Moore murdered while travelling by dak to Sambalpur.
18. Robert Lyell murdered at Patna, while at the head of a Sikh Guard sent out to quell a riot. He had been Surgeon to the Guides, and wrote an account of the fevers of the Eusufzai District.
19. Horatio P. Harr's, Civil Surgeon of Cawnpore, perished with his wife in the massacre there.
20. George Hansbrow, Superintendent of the Central Jail, Bareilly, murdered there.
21. J. P. Bowling, 56th N. I., perished in the Cawnpore massacre with wife and child.
22. A. Dopping, 54th N. I., Garrison Surgeon at Delhi, where he was murdered.
23. Marcus G. Hill, Oude Irregular Force, murdered at Seetapore by the men of his regiment.
24. R. H. Bartrum killed in action in the advance on Lucknow under Outram.
25. Daniel McAuley murdered in the massacre at Cawnpore.
26. Edmund Darby died November 22nd from effects of a wound received in the advance on Lucknow under Sir Colin Campbell. His wife and child had been murdered at Cawnpore.
27. W. H. James, F.R.C.S.I., murdered with his wife at Augur by men of the Gwalior Contingent.

THE following figures show the losses from wounds and disease in the Crimean War, and may be compared with the figures for the present War in South Africa:—

Of 93,959 British troop sent to the Crimea, 4,446 were killed in action or died of wounds, 16,298 from disease, and 12,903 were invalided. The total *hors de combat* at end of the war was 35 per cent of total strength.

The following tables give the losses in the allied armies:—

MINUTION OF STRENGTH.

	By death.	By invaliding.	<i>Hors de combat.</i>	Percentage of troops left at end of war.
English ...	22·7	17·3	35·8	64·2
French ...	22·9	21·4	44·3	47·2

OUR readers will have read in the daily papers of the reception dinner given to Sir Wm. MacCormac and Mr. Frederick Treves on their return to London after the War. Sir William chiefly referred to the small amount of damage done by the Mauser bullets, and to the future of the Transvaal under British rule.

Mr. Treves in his speech paid high testimony to the valour and endurance of the British private soldier. He also referred to the "plague of flies" in the form of amateur nurses who proved themselves a nuisance during the campaign. Mr. Treves' views on this point are of special importance, for no one knows better than he of the value of a really good trained nurse.

On the whole, as far as can be seen, the plan of sending men of eminence like Sir Wm. MacCormac and Mr. Treves to the war as consultants must be said to have been a success.

As there are probably very few of our readers who have perused the minute on the constitution of the Indian Medical Service written by the "great pro-consul," the Marquis of Dalhousie, in February 1856, the following extracts will be interesting:—The Governor-General points out that "the beginning, middle and end of the imperfections of the I. M. S. is the vicious principle on which the Medical Board of Direction is selected." To modify this system of "rigid seniority;" he proposed the appointment of a Director-General on a salary of Rs. 3,500 a month, and two Inspector-Generals, one Military and one Civil. Then the "next twelve best men" not, "the next twelve oldest men" to be Superintending surgeons. After these he recommended the appointment of twelve staff surgeons on Rs. 1,000 a month. The noble Marquis also writes strongly on the now settled question of relative rank, and protested against the "most galling, most unmeaning and purposeless regulation" refusing medical officers substantive rank. Most of these proposals were put into effect by the Hon. East India Company in the following year.

WE have all recently read of the sufferings of the Ladysmith garrison, it is interesting, therefore, to compare them with those of the famous Lucknow garrison. The Lucknow siege lasted from 30th June 1857 till 25th September, when Outram and Havelock arrived, or to the final relief under Sir Colin Campbell on 17th November. The strength of the garrison was 1,467 Europeans, including over 500 women and children, and 1,515 natives, of which only 611 were fighting men. So that the total fighting strength was only 1,538 men.

The food was scanty, eggs sold at Rs. 2 a piece; the children lived on *soojee* and rice, and the women on *attah chappaties*. The chief diseases were cholera, diarrhoea, dysentery, small-pox, "a low kind of typhus," and scurvy. Out of the total strength of the garrison on the arrival of General Outram on 25th September, there had perished 557 out of 2,240, excluding unknown losses among private servants. 405 of these were European, men, women, and children. Forty Europeans were admitted to hospital with bullet wounds, and 260 natives, of these 100 or exactly one-third proved fatal.

Surgeon-Major Greenhow, who writes the above account, concluded that amputations were generally not successful.—*J. A. Med. Sci.* 1858, p. 370

THE following extract is quaint: it is taken from Dr. McRae's report on the Field Hospital of the army of the Punjab during the campaign, 1848-9 (Chillianwalla):—

"Chloroform was not much used amongst the primary amputations, &c., for two reasons—(1) The man seldom expressed a wish to be put under its influence; and secondly, the convulsive movements of the limbs which frequently attend the use of this anesthetic agent are very troublesome to the operator. Chloroform, however, was used with the greatest safety and success in secondary operations." Dr. McRae stated that he "had now used chloroform 100 times."—*J. A. Med.-Sci.*, Vol. 8, 1857.)

IF we are to believe all that has been written by various surgeons who have written to the medical papers on the War, there will need to be new and revised editions of most text-books on gunshot wounds. The experiences of 1870 are being rapidly replaced by those of the present war.

IN his report on recruiting for the army for 1899, the Inspector-General of Recruiting says that, owing to the war the number of recruits had greatly increased, and that they were men of a finer physique than usual. In the Inspector-General's opinion this satisfactory result is due to the decision of Government and other employers of labour to keep their places open to reservists called upon to rejoin the colours.

WE regret to record the death of Lieutenant C. H. B. Adams-Wylie, I.M.S., who died at Bloomfontein of Enteric Fever. He only left India for South Africa a few months ago. He entered the service in January, 1899.

LIEUTENANT-COLONEL D. W. D. COMINS, I.M.S., is permitted to retire from the service. Lieutenant-Colonel E. Mair will now become Inspector-General of Jails, Bengal.

Gazette Notifications.

N.-W. P. AND OUDH.

The services of Major H. W. STEVENSON, I.M.S., K.-I.-H., are replaced at disposal of the Government of India.

Captain CHAYTOR-WHITE, I.M.S., is granted furlough (*m.c.*) for 1 year.

Captain E. J. MORGAN, Officiating Civil Surgeon, Mainpuri, to officiate as Superintendent, Central Jail, Farukabad, as a temporary measure, *vice* Major R. C. MACWATT, I.M.S.

Captain J. S. STEVENSON, I.M.S., to be Deputy Sanitary Commissioner, 2nd Circle.

MILITARY DEPARTMENT.

Colonel G. McB. DAVIS, M.D., C.B., D.S.O., I.M.S., is appointed to officiate as P. M. O., Punjab Command, with the temporary rank of Surgeon-General, *vice* Surgeon-General L. D. SPENCER, C.B., I.M.S., on leave.

Lieutenant-Colonel J. T. B. BOOKEY, I.M.S., is granted temporary rank of Colonel, while officiating as P. M. O., Punjab Frontier Force, *vice* Colonel G. McB. DAVIS, I.M.S.

Lieutenant-Colonel H. F. F. F. ESMONDE-WHITE, I.M.S., is granted temporary rank of Colonel, while officiating as P. M. O., Bangalore, *vice* Colonel T. J. MCCANN, I.M.S.

Lieutenant-Colonel J. T. B. BOOKEY, I.M.S., is promoted to Colonel, *vice* Colonel CARMICHAEL, retired.

Lieutenant-Colonel C. J. H. WARDEN, I.M.S., is permitted to retire.

BENGAL.

Captain T. A. O. LANGSTON, I. M. S., Inspecting Medical Officer, Chausa, is appointed to act as Civil Surgeon of Burdwan, *vice* Captain J. C. S. VAUGHAN, I. M. S., on privilege leave.

Lieutenant-Colonel T. GRAINGER, I. M. S., on furlough, is appointed Civil Surgeon of Durbhunga.

Captain A. GWTHER, I. M. S., is appointed Civil Surgeon of Khulna.

Captain J. T. CALVERT, I.M.S., Civil Surgeon of Bhagalpur, is appointed to act as Civil Surgeon of Durbhunga.

Lieutenant D. McCAY, I.M.S., is appointed to have medical charge of Civil Station of Dinapore.

Major F. P. MAYNARD, I.M.S., reported his departure on furlough on 1st April 1900.

Dr. W. FORSYTH reported his departure on furlough on 7th April 1900.

Major W. J. BUCHANAN I.M.S., made over charge of Central Jail, Bhagalpur on 13th April 1900.

Captain B. H. DEARE to act as Superintendent, Central Jail, Midnapur, *vice* Mr. M. S. Emerson, on leave.

Captain E. A. R. NEWMAN, I.M.S., to act as Superintendent, Presidency Jail, Calcutta, *vice* Captain E. E. WATERS, I.M.S., on privilege leave.

BOMBAY.

Lieutenant J. L. MAJORIBANKS to act as Civil Surgeon of Sukkur.

Captain S. H. BURNETT, M.B., I.M.S., to be Resident Surgeon, St. George's Hospital, *vice* Major HOJEL, I.M.S.

Captain J. H. McDONALD, I.M.S., to be Personal Assistant to the Surgeon-General, Bombay.

GOVERNMENT OF INDIA.

Lieutenant W. H. COX, I.M.S., is posted as Agency Surgeon in Bundelkand.

Captain C. T. HUDSON, I.M.S., is appointed to officiate as Deputy Assay Master, *vice* Major LLOYD JONES, I.M.S.

Lieutenant-Colonel C. H. SWAINE, R.A.M.C., to officiate on the Administrative Medical Staff of the Army, *vice* Colonel R. DE LA C. CORBERT, D.S.O., R.A.M.C., on special duty.

Lieutenant-Colonel A. DEANE, I.M.S., has been permitted to retire.

CENTRAL PROVINCES.

The services of Captain F. H. WATLING, I.M.S., are placed temporarily at the disposal of the Central Provinces, and is appointed to act as Civil Surgeon of Betul.

The services of Lieutenant-Colonel G. F. A. HARRIS, I.M.S., are replaced at disposal of Home Department.

Major ANDREW BUCHANAN, I.M.S., is granted one month's privilege leave.

Captain W. HENVEY, I.M.S., has been granted leave out of India for 6 months.

ASSAM.

Military Assistant-Surgeon F. G. HENDERSON is appointed to hold medical charge of Garo Hills District.

Captain H. S. WOOD, I.M.S., is confirmed as Civil Surgeon, Sylhet.

PUNJAB.

The services of Major J. R. ADIE, I.M.S., are placed permanently at the disposal of the Punjab Government.

The services of Captain E. S. PECK, I.M.S., are placed temporarily at the disposal of Punjab Government.

MADRAS.

The services of Captain J. DAVISON, I.M.S., are replaced at the disposal of Home Department.

THERAPEUTIC NOTES, PREPARATIONS, &c.

WE have already called attention to the manifold advantages of the **aseptic aluminium hypodermic syringe** made by Messrs. Parke Davis & Co. We are now informed that this syringe is obtainable from that firm's Agent in India, Mr. Norman S. Rudolf, at Simla. We have used this syringe for some years past and have no hesitation in saying that it is one of the best in the market. The arrangement for the needles and their cheapness (six for two rupees) is enough to make this syringe a success.

The same enterprising firm have sent us a pamphlet on the treatment of indigestion or superdigestion by the use of **Taka Diastase**. This preparation has an action identical with that of ptyalin on starches. It is a drug that has come to stay. It can be obtained either in gelatin capsules, in compressed tablets or in a fluid form. It is best taken immediately after a meal in plain water.

Antipyrine has been successfully employed by Dott in the treatment of **Menstrual Epilepsy**, which had previously resisted treatment by bromide. Commencing a few days before the expected period, three or four times daily a powder containing five grains of antipyrine and two grains of sodium bicarbonate were administered. For the first time in five years this period passed without symptoms, and the continuance of this treatment at subsequent periods was successful—HARE: "Progressive Medicine."

To Remove the Smell of Iodoform.—After using iodoform, wash the hands in soap and water, and rinse them in a little vinegar. This will entirely remove the odour.—*Practitioner*.

Urinary Antiseptics.—SLUYTS (*Centralblatt für Chirurgie*, No. 4, 1900), as a result of an experimental research with the ordinary pathogenic microbes found in the urine, finds that salol is distinctly the most effective drug we possess in inhibiting or destroying these growths.

Groschlik, after an extensive experience with urotropin, states that this medicament does not destroy the microbes found in the urine, and that even its inhibiting action is comparatively slight and of brief duration; hence it is of distinctly less potency than salol or sodium salicylate. He notes that the infectious diseases of the urinary tract are not beneficially influenced by urotropin.—*Therapeutic Gazette*.

Notice.

SCIENTIFIC Articles and Notes of Interest to the Profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if requested.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., Calcutta.

Annual Subscriptions to the *Indian Medical Gazette* Rs. 12, including postage.

BOOKS, REPORTS, &c., RECEIVED.

Registrar-General's Report, Ireland. Noble Smith's Deformities of Lower Extremities. The Medical Review, vol. 2. The Bengal Administration Report. The Report of the Dufferin Fund. The Transactions of Bombay Physical Society. Gould's Pocket Medical Dictionary. Bengal Jail Administration Report. Punjab Jail Administration Report. Lunatic Asylums Report, Assam and Central Provinces.

COMMUNICATIONS RECEIVED FROM:—

Major F. P. Maynard, I.M.S., London; Capt. G. Lamb, I.M.S. Bombay; Capt. L. Rogers, I.M.S., Calcutta; Capt. J. T. Calvert, I.M.S. Durbhunga; Lieut.-Col. A. J. Baker, I.M.S., Bombay; Major J. A. Cunningham, I.M.S., Delhi; Capt. H. Smith, I.M.S., Jalandar; Dr. A. Neve, Srinagar; Major J. H. Tull-Walsh, I.M.S., Berhampur; Capt. O'Kinealy, I.M.S., Calcutta; Professor G. Adami, Montreal; Secretary Medical Library, McGill University, Montreal; Secretary, Medical Faculty University of Philadelphia; Col. K. McLeod, I.M.S., Netley; Capt. S. P. James, I.M.S., Quilon; Major Marks, I.M.S., Etawah; Mr. N. Rudolf, Simla; Lieut.-Col. Perry, I.M.S., Lahore; Major J. K. Close, I.M.S., Moradabad; Capt. Birdwood, I.M.S., Ghazipur; Lieut.-Col. Hatch, I.M.S., Bombay; Capt. A. E. Grant, I.M.S., Madras; Dr. D. F. Keegan, London; Dr. P. J. Freyer, London; Lieut.-Col. P. Durrell Pank, I.M.S., Jeypur; Major D. M. Moir, I.M.S., Chittagong; Capt. N. P. O'G. Lalor, I.M.S., Shillong; Major C. E. Sunder, I.M.S., Gaya; Major G. M. Giles, I.M.S., Naini Tal; Major C. R. M. Green, I.M.S., Mozufferpur; Major D. M. Davidson, I.M.S., Mooltan; Dr. R. Ashe, Mynensingh; Lieut.-Col. H. Hamilton, I.M.S., Almora; Major H. Hudson, I.M.S., Port Blair.

Original Articles.

NOTE ON LITHOLAPAXY IN BOYS.

By D. F. KEEGAN,

F.R.C.S., ENG.,

Indian Medical Service (retired).

ON the 15th December 1881, I performed my first litholapaxy on a young boy at the Indore Charitable Hospital, Central India. Between that date and the 5th June of the present year, 500 litholapaxies have been performed on boys at that hospital. The mortality which followed these 500 operations was 11. The death-rate has therefore been 2.2 per cent. During this same period 18 litholapaxies were performed on young girls, and all these cases were successful. Out of the 500 operations on boys, I did 239, and lost five cases. The cause of death in my five fatal cases was extensive kidney disease. In four of the fatal cases I was fortunate enough to obtain a *post-mortem* examination, and I am therefore in a position to state the cause of death. In the solitary case in which I was not permitted to make a *post-mortem* examination I feel sure that the cause of death was organic disease of the kidneys, and if any of my readers will turn to page 225 of this Journal (August 1888) he will find this case related at some length. My assistant at the Indore Hospital, the late Gunput Sing, performed five operations out of the total 500 and lost one case. This case is related at considerable length at pages 135 and 136 of this Journal (May 1884). Rightly speaking, it should not find a place among the fatal eleven litholapaxies, for it was a mixed case of lithotripsy and litholapaxy, but as I have always included it among our fatal cases, I do so on the present occasion. The late Colonel Randolph Caldecott, Bombay Medical Establishment, who succeeded me at Indore and who acted for me on two occasions when I was on furlough in Europe, performed 170 operations out of the total of 500. He lost four cases, one of which was due to extensive organic disease of the kidneys as verified by a *post-mortem* examination. In another of his cases a *post-mortem* examination showed that a sharp pointed fragment of stone had pierced the wall of the bladder opposite Douglas's pouch, where the wall was very much thinned. The piece was found lying in the rent and peritonitis had in consequence been set up, see page 356, *Indian Medical Gazette* (December 1886). What was the cause of death in the remaining two fatal cases which occurred in his practice, I am not in a position to state. In one case the boy's age was three years, the stone removed

weighed 50 grains, and he had suffered from symptoms of stone in the bladder for eighteen months prior to admission into hospital. He died the day succeeding the operation. The register simply notes his death. In the second case the boy's age was twelve years, the stone removed weighed 242 grains and consisted of oxalate of lime and phosphates, and he had suffered from symptoms of stone for two years previous to admission into hospital. The time occupied in performing the operation was seventy-one minutes. He died two days after operation. I have never heard that these two fatal results were due to any accident during the operation. Had it been so, I think I should have been informed. Colonel Caldecott's assistant Dr. N. V. Bhagwat did ten operations out of the 500, and 76 litholapaxies were carried out by Lieutenant-Colonel G. H. D. Gimlette, the present able Residency Surgeon at Indore. Lieutenant-Colonel Gimlette lost but one case in 76, and this death was caused by very extensive kidney disease.

Grouping the 500 litholapaxies together, the work mainly of three Surgeons, I find that the average age of the boys operated on, was six years, the average weight of stone removed at each operation was 95 grains, and the stay in hospital after operation amounted to four days. The mortality as already stated was eleven or 2.2 per cent. I think, therefore, that we have some reason to congratulate ourselves on the results achieved. The particulars of every one of these operations have been tabulated according to a fixed plan which is already familiar to many of the readers of this Journal. Regarding the mortality, I do not think that in years to come it can ever fall much below 2 per cent. in boys, let the operation be performed as skilfully as it is possible to do it, for we can never eliminate organic disease of the kidney from the adverse conditions we have to deal with when we set about performing litholapaxy. And the same danger lurks in the path of the most skilful lithotomist when he cuts a boy for stone. I have had the good luck to perform 116 consecutive successful litholapaxies in boys at Indore, but my one hundred and seventeenth operation ended fatally by reason of very extensive organic disease of both kidneys. When the kidneys are extensively diseased, and the stone a large and hard one, and the operation consequently a prolonged one, the result is very often fatal. In such cases I am of opinion that the fatal result is in a great measure due to the large quantity of chloroform inhaled by the young patient. The kidneys diseased though they be have been just able to carry on the work of eliminating the effete tissues from the body prior to the litholapaxy, and it would seem that the narcosis produced by the chloroform inhalation is sufficient to weigh down the vital scale, and the patient

though relieved of the stone in his bladder and the pain attending it, dies a day or two after the operation with all the symptoms of uræmic poisoning. It is in such cases I maintain that a doubt will arise in the mind of the cautious surgeon whether a comparatively rapid perineal lithotomy would not be preferable to a prolonged litholapaxy. In our daily practice in India, however, there are many and obvious objections to keeping young boys for many days under observation in hospital preparatory to operation. The parents and relatives who bring the boys to hospital are generally in a great hurry to return to their homes, and if the operation is postponed with a view of studying the case, and of observing the general condition of the patient and of finding out the exact condition of the kidneys, the parents and relatives often decamp in the night and take the patient with them. On several occasions at Indore I have been chagrined and disappointed to find on my reaching the hospital in the morning, that the boy on whom I had intended to operate for stone had been taken away by his parents during the night, perhaps not to return for a year or two when the calculus had increased considerably in size and the general health of the patient shattered by long suffering. And as I gained experience, I made it my practice to operate on a boy as soon as possible after his admission into hospital. But given time and patience there were many occasions in which, doubtless, the boys would have derived much benefit by being detained in hospital preparatory to operation. Regarding the instruments requisite to perform litholapaxy on a wide scale in boys, I have some remarks to make. When I left Indore for good in 1894, I left behind me the most complete set of lithotrites suitable for boys and adults which exists in India. They were all fully fenestrated and made by Weiss and Son. Weiss' instruments are expensive in the first instance, but they are far and away the cheapest in the long run, and I should never think of using any other. We had at Indore, when I left, over a dozen lithotrites ranging from No. 4 to No. 12 (English scale). We had Nos. 4, 5, 6, 7, 7½, 8, 9, 9½, 10, 10½, 11 and 12, and we had duplicates of several of them. Our evacuating catheters or canulæ ranged from No. 5 to No. 12 (English scale) and we had several sets of them. During the year, 1894, Weiss and Son constructed for me a No. 3½ lithotrite, and I sent it out to Colonel Caldecott, and it has done good work ever since. The first occasion on which Colonel Caldecott used it was on the 12th January 1895, when he crushed an uric acid calculus weighing 36 grains for a boy, aged three years. The boy remained only two days in hospital, so his cure was a rapid one. On looking through the register of all the litholapaxies which have been performed at

Indore since I left it, I find that this small lithotrite has been used on seventeen different occasions. Colonel Caldecott in his lifetime wrote and told me how much he was pleased with it, and how valuable he found it on one or two occasions. To give an example. On the 24th March 1896, he crushed an uric acid stone weighing 7 grains for an infant, named Moosa Ibrahim, aged only eighteen months. The little lithotrite was introduced but once in the bladder, the operation lasted four minutes, the *débris* was drawn off through a No. 6 canula, and the child remained in hospital for two days after the operation. Symptoms of stone in the bladder had appeared only eight days before the child was brought to hospital; evidence that the natives in the neighbourhood of Indore are fully alive to the advantages of early operation in cases of stone in the bladder.

Captain C. Duer, junior Civil Surgeon, Rangoon, in the April number of this Journal states that the performance of lithotripsy in children is not infrequently impossible (1) from inability to pass the lithotrite, and (2) on account of the magnitude of the stone, and then remarks that the lithotrites commonly supplied in India for operations on children are No. 6 and No. 8 Weiss' Gauge. I need hardly point out that litholapaxy in children cannot be carried out to any large extent with a No. 6 and a No. 8 lithotrite, for there are many cases in which a No. 6 lithotrite cannot by any possibility be passed into the bladder of a child of five years. To be in a position to deal with most cases of calculus in young boys by litholapaxy, the surgeon should have at hand at least three or four lithotrites of different sizes, say, for example, a No. 5, a No. 6, a No. 7 and a No. 8. Such a set of lithotrites with evacuating canulæ and two *débris* extractors would cost at the least £35. Local Governments in India, like the Government of the North-West Provinces and the Punjab, where stone in the bladder is so common, should be prepared to supply branch dispensaries with sets of lithotrites and canulæ in order that the natives of these provinces should derive the benefit of the extension of litholapaxy to cases of stone in children, for, as I have shown in the *Lancet* of the 16th January 1897, the death-rate following litholapaxy in boys in the Punjab during the year 1895 was less than half of the mortality which followed lateral lithotomy in this same class of patient. Such an expenditure would not be warranted in the Madras Presidency or throughout Burmah or even in some districts of Lower Bengal where stone in the bladder is a comparatively rare disease. But in the Punjab, Sind, the North-West Provinces and in some districts of the Bombay Presidency where stone in the bladder is prevalent, the peasant in the fields has a right to look to Government that his son when suffering from stone

in the bladder should have it extracted by a crushing and not by a cutting operation. It may be argued that the expense of furnishing branch dispensaries with complete sets of litholapaxy instruments would be a very heavy one. Doubtless it would be, but Local Governments could easily divert a small portion of their educational funds for such a charitable purpose. It is the peasant who pays all our salaries in India and our pensions when we retire, and surely he has the first claim on our charity, and it seems hard that he should be obliged to toil in order that the rich *bunniah's* son should receive an education in high flown English at his, the peasant's expense.

Readers of this journal are aware that in its pages I have for many years persistently advocated the claims of litholapaxy in boys over its rival lateral lithotomy, and now that experience has taught us that the death-rate following litholapaxy in boys in India is but half of that which follows lateral lithotomy in this same class of patients, I think we may with some confidence look forward to the day when a cutting operation for the removal of an uncomplicated stone from a boy's bladder in India will be a somewhat rare surgical procedure. I write, in India, advisedly, for I must confess that for some years I have abandoned the idea that among general Surgeons in Europe, Great Britain, and in America, litholapaxy will be the operation of election in male children; and I think they will be acting wisely in adhering to the good old lateral or perineal lithotomy when called to treat a case of stone in the bladder of a young boy. The specialist, however, in urinary surgery in Europe and America, the man who is being continually afforded opportunities of working with the lithotrite, and who by experience has learned to use it with precision and dexterity will, I trust, soar higher, and adopt litholapaxy in boys. The fact is that the general Surgeon in Europe, Great Britain and in America gets so few opportunities of working with the lithotrite, that he feels himself quite unequal to the task of performing a litholapaxy in a boy with satisfaction to himself or with safety to his patient. I wonder how long it would take one to become a fairly good horseman if one got a mount only once a month? Certainly it would take many years. Well, it is much the same in learning how to use the lithotrite. A man must be afforded frequent recurring opportunities of working with it, if he is to acquire a practical familiarity of its use within a reasonable space of time. I trust that this series of 500 litholapaxies in boys, performed at the Indore Hospital by three Surgeons, may find a permanent place among surgical statistics, and that in future these statistics may be quoted by Surgeons when dealing with the literature of the surgery of stone in the bladder in children.

Dr. G. Frank Lydston in his excellent work on the Surgical Diseases of the Genito-urinary Tract (1899) writes as follows: "The first reaction against perineal lithotomy in children was based mainly upon the results obtained by Keegan, who claimed that litholapaxy should be the operation of election even in children. Keegan's dictum being supported by the moderate experience of a few litholapaxists, has impelled some authors to accept litholapaxy as the only operation in children. Taking Keegan's own statistics as a basis, let us see whether the claims for litholapaxy are as yet substantiated. It must be remembered that in comparing Keegan's results with those of other operators, we are necessarily comparing the results obtained by the man who should be the most expert in its performance with those obtained by operators of less experience and skill. In 115 cases of litholapaxy in children, ages not stated, Keegan lost 4 or $3\frac{4}{10}$ per cent. On the other hand, in a total of 355 cases of perineal lithotomy in children, performed by four operators and at the Massachusetts General Hospital by several different operators the mortality was 11 or 3.1 per cent."

With reference to the above quotation, I beg to state that I have never, either in the pages of this journal or in the *Lancet*, or elsewhere, published any statistics of litholapaxy in boys without stating the ages of the patients operated on. To have done so would have been extremely foolish, not to say dishonest, for such statistics would not have been worth the paper on which they appeared. In the *Lancet* of July 28th, 1894, page 186, I wrote as follows:—"I have now placed on record and in tabular form the particulars connected with 239 litholapaxies performed on male children and boys with my own hands, and reviewing the statistics of these operations, I find that the average weight of stone removed by each litholapaxy was 98.44 grains, the average number of days spent in hospital after operation was 4.16, the average age of boys operated on was 6.4 years and the rate of mortality was 2.09 per cent." Had Dr. Lydston read my paper in the *Lancet* of July 28th, 1894, I feel quite sure that the passage which I have just quoted from his recent excellent work would never have been written, and I feel equally sure that in the next edition of his work he will give due prominence to the series of 497 litholapaxies performed on boys at the Indore Charitable Hospital. We surgeons who have lived our lives in India have done and are doing our best to extend the operation of his illustrious countryman, Bigelow, to the treatment of stone in the bladder in Indian boys, and by doing so we are happy to think and to know that we have reduced the mortality following stone operations among boys in India by more than fifty per cent., and that we have mitigated their sufferings in a vast degree.

PERINEAL LITHOLAPAXY.

By W. H. HENDERSON,

LIEUT.-COL., I.M.S.,

Surgeon to the Goculdas Tejpal Hospital, Bombay.

OF the 1,200 litholapaxies which I have performed, 110 have been through the perinæum, an operation which I propose to make the subject of this paper. The manifold advantages of this operation have not, I think, gained for it that general adoption which it deserves. That litholapaxy is, with but very few exceptions, the best operation, cannot for a moment be disputed. It is the operation of election. It would therefore naturally be the aim of the litholapaxist to avoid a return to those methods which have been supplanted by the crushing operation or by some modification of it. The operation under discussion has therefore this very cogent argument in favour of its adoption; it saves, in many instances, patients from cutting operations with their attendant risks and protracted convalescence. That there are occasions in which either a lateral, a median or supra-pubic lithotomy has to be performed, is not for a moment denied. Anything, however, which lessens this possibility is desirable. As I have already mentioned, I have performed 110 operations through the perinæum, and I can confidently affirm that had it not been for my resort to this modified operation my litholapaxies would have been reduced and my lithotomies increased by this number.

A detailed description of the operation, its simplicity, the facility with which it is performed, the absence of bad effects, both immediate and remote, and the rapid convalescence which follows will, I am sure, serve to emphasize all I have said in its favour.

Surgical text-books are in most instances either silent on the subject or devote but a cursory description to the operation. The credit of being its first performer is ascribed to Dolbeau, a French Surgeon. As far as I can glean from the literature on the subject at my disposal,¹ the introduction of the instrument for the removal of the stone *débris* through an aperture just large enough for the purpose, was not then recognized as it is now, to be of the very greatest importance. The instruments used by M. Dolbeau are much larger than the lithotrite.

The cassepierre appears to be an instrument of considerable size which breaks up the stone but does not crush it. Fragments instead of *débris* are extracted which would seem to point to an aperture of considerable dimensions. To Mr. Harrison is due the credit of re-introducing of late years the operation.² The fact that he prefers a special forceps to a lithotrite for

crushing the stone, and that one of his reasons for its adoption is the subsequent continuous drainage of the bladder, would indicate his following very closely on the lines laid down by its originator. A description of the operation will show that the size of the perineal opening must be barely large enough to admit the lithotrite required, and that this object is attained after the first incision is made, not by the knife but by gradual dilatation.

The operation is thus performed: a staff is introduced into the bladder, a small incision is then made, with a tenotomy knife, through the perinæum into the membranous portion of the urethra, which is then dilated to the required dimensions.

A tenotomy knife is used, so that the primary incision may not be larger than is absolutely necessary. A director is then introduced, and the process of dilatation by the passing of female bladder sounds of various sizes is gradually and patiently accomplished. Upon the care and skill with which this, the first step of the operation, is performed, depends to a very great extent the rapidity and facility with which it is concluded. If the lithotrite does not accurately fit the urethral opening, the fluid injected into the bladder during the operation rapidly escapes. I need not comment here on the difficulties and delay likely to be caused by operating when the bladder is empty and contracted. At the same time it is of the greatest importance that the introduction of the instruments should be without difficulty. To insure this the incision must be made directly on to the staff. If the skin or intervening parts are moved, the passage is not free and a valve is, as it were, formed between the external wound and the urethral incision. When the incision is made directly on to the staff, the lithotrite slips into the bladder, the canula is introduced without difficulty and all goes well. But if this is not the case, the introduction of the instruments is a matter of very great difficulty. They may miss the urethral opening and pass up between the bladder and the rectum with grave and even fatal consequences.

The following tables will show the results of my perineal litholapaxies:—

Details of Perineal Litholapaxies.

	Total number.	Recovered.	Died.	Percentage of deaths.	Percentage of recoveries.
In adults ...	13	13	...	...	100
Male children	97	94	3	3.09	96.91
TOTAL ...	110	107	3	2.73	97.27

It will be seen from the above that the necessity for this operation is most frequent in children. In adults the difficulties of a narrow

¹ *La Lithotritie Périnéale.*² *Injuries and Diseases of the Genital and Urinary Organs, Henry Morris.*

urethra or a stricture can, given a stone capable of being crushed by a moderate sized instrument, be easily overcome. It is when the size of the stone or its extreme hardness calls for the largest and most powerful instruments that the movable portion of the urethra has to be avoided. By entering the urethra through the membranous portion, the narrowest and most muscular part of the canal is incised, the posterior portion of the penile urethra, where stricture is most frequent, is left untouched, and the instrument is introduced directly into the prostatic part where stricture never occurs, and which is the widest and most dilatable portion of the whole passage.

In children the passage of the membranous portion is, in my experience, the most difficult. It is at this point that I most frequently find that even small sized lithotrites become impassable. Nor is the difficulty where it exists, likely to be overcome, as in addition to its narrowness spasm frequently increases the original obstruction.

The operation should be performed, especially in children, not only where the urethra is impervious to the passage of sufficiently large instruments, but where it is so narrow as to make the passing of the instrument difficult. *Débris* will silt up during an operation, and an instrument inserted with difficulty may not be able to be withdrawn without grave or fatal injury. I have, on more than one occasion, finished through the perinæum, an operation commenced by the urethra, when such difficulties and dangers were anticipated.

In children where the stone is very large or of extreme density, the perinæal operation is, in my experience, the surest and safest way out of the difficulty.

By no means the least important recommendation to the operation is the rapid manner in which patients recover from its effects. Major R. J. Baker, I.M.S., in a paper read before the Royal Academy of Ireland (Section of Surgery)¹ has called attention to the usual marvellously rapid convalescence. I have frequently seen patients within a few hours of the removal of stones of considerable size, passing their urine by the natural way. This is of course not always the case, as sometimes after the removal of a very large stone and a proportionately long and tedious operation the greater portion is passed through the wound. But even when this is the case, the return to the natural channel is delayed for two or three days at the most. This satisfactory result is no doubt brought about by the insignificant dimensions of the original wound, which on the day following the operation is often hardly visible, and by the fact that the incision is made in the long axis of the most muscular part of the whole urethra. The spas-

modic action of this fixed portion of the canal has doubtless a tendency to keep the wound closed, blocked as it probably is by the turgescient state of its lining mucous membrane. In no case have I ever seen a permanent perinæal fistula follow the operation.

Another great advantage during convalescence is, that micturition is invariably a voluntary act. There is no escape of urine as in the cutting operations through the perinæum. The patient whether he passes his urine at once through the meatus or not has command over the bladder from the first. The bladder is not interfered with structurally, nor, in successfully and quickly performed operations, functionally. The wound is saved from perpetual contact with the urine and the consequent irritating results, and the patient from the discomfort of constant dribbling. The success following the operation at the Civil Hospital, Hyderabad, has been most encouraging. Dr. Keith, I.M.S.,² who was the first to perform it there, records 53 cases in men with 3 deaths, and 106 in children, all successful. Major Baker's experience and my own point to equally satisfactory results.

The operation, which is now very commonly performed in Europe on children and in adults where the stone is very large, is supra-pubic cystotomy. It is described by the late Greig Smith³ as not a difficult operation, and is at present on the crest of the wave of popularity and perhaps just a little over-praised.

The early mortality which was reported to be under 15 per cent. has of late fallen very considerably. Dr. Ussendelft,⁴ a Russian Surgeon, has recorded the splendid result of only two fatal cases in 102 operations. It has also this further very strong recommendation; it facilitates the speedy removal of large stones. Nothing militates so much against success as prolonged narcosis in the old and broken down. Large stones in children mean prolonged suffering and enfeebled and debilitated constitutions. Expedition therefore becomes of primary importance, and to insure it when litholapaxy is chosen great dexterity is necessary. This the surgeon, who has gained his experience in India, has golden opportunities of attaining, and to this doubtless much of his success is due. What could therefore be attempted by him and carried through to a successful issue, might rightly be avoided by others. But putting aside these cases in which there is this danger of unduly prolonging the operation, others are constantly occurring where the obstacles to the use of the lithotrite are simply and easily overcome and when perinæal litholapaxy cannot fail to prove an invaluable addition to the surgery of urinary calculus.

² *Lancet*, June 4th, 1892, and September 30th, 1893 (also *r. below* p. 327).—Ed., I. M. G.

³ *Abdominal Surgery*, Vol. II. Greig Smith.

⁴ *Abdominal Surgery*, Vol. II, Greig Smith.

¹ *B. M. J.*, March 5th, 1893.

THE TREATMENT OF STONE BY LITHOTOMY AND LITHOLAPAXY.

BY P. DURRELL PANK,

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THE following remarks are compiled from notes of my personal experience in the treatment of vesical calculus by the operations of lithotomy and litholapaxy: and in addition to my own notes, I have availed myself of the valuable and carefully kept surgical records of the Mayo Hospital, Jeypore, Rajputana, from 1881 to the present year.

Colonel T. H. Hendley, I.M.S., C.I.E., was Superintendent of the Dispensaries and of the Mayo Hospital, Jeypore, from 1881 to early in 1898, and performed nearly all the operations of lithotomy and litholapaxy (except when on leave) during that period; I acted for him for eighteen months in 1891-92, for nine months in 1897, and succeeded him as Superintendent in April 1898.

I think it may be taken as granted that to the patient and the surgeon, the chief interest attached to the subject of stone in the bladder is connected with the best and most successful method of removal; and in my opinion the almost invariable answer, at the present time, to the question, what is the best and most successful operation for stone in the bladder is litholapaxy.

Speaking from my own experience, no comparison can be maintained between the old operation of lithotomy by whatever method, and the modern operation of litholapaxy.

In describing the operation of litholapaxy as performed at present at the Mayo Hospital, Jeypore, I will take the case of a man or boy attending the outdoor department in the ordinary way: from the description of his symptoms, which are those usually attributed to stone in the bladder, the presence of stone is suspected, and the patient is sent to the operation room for examination; this may be done under chloroform or without its aid; as a rule chloroform is only given at the time of examination to very young children or to those patients who have acute or extensive cystitis, or who cannot stand the pain caused by the sound, or if an extended examination of the bladder is necessary. If after a careful and thorough exploration of the bladder by the sound no stone is detected, the sound is withdrawn, and the largest canula which the urethra admits easily is introduced into the bladder and the contents drawn off; about 2 oz. of warm boric solution is then injected into the bladder and the aspirator applied; a few compressions of the aspirator will often demonstrate the presence of an otherwise undetected stone, which will audibly

"click" against the eye of the canula. A stone being found, the general health and condition of the patient is noted, and a purgative, to be taken at night followed by an enema the next morning, is ordered for him; castor-oil is generally used, and if this cannot be taken, calomel followed by a saline purge is almost as good; he also gets a thorough cleansing in a bath of warm water on the day of admission. On the following morning, fasting, and after the enema has been evacuated (it is just as well to ascertain that it has been got rid of), he is placed on the operation table and chloroformed; the patient lies extended on the table with a small flat pillow covered with waterproof under his buttocks; two assistants are required, one on either side of the table, to hold the patient's arms and legs, a third assistant to have charge of the instruments, to empty and fill the aspirators and hand the lithotrites to the surgeon, and a fourth to administer the chloroform. A table most suitable for the operation is made by Messrs. Arnold and Sons of zinc with a perforated top and a reservoir for hot water for its whole length, which keeps the patient comfortable and warm; and is provided with a collecting trough underneath into which all waste water and urine runs.

When completely under the anæsthetic, the largest canula which will pass easily is introduced into the bladder;—the meatus is often smaller than the urethra, and when so should be cut with a pair of blunt pointed scissors, one blade of which is inserted into the urethra for an eighth of an inch and the slight incision made to one side of the frænum; through the canula about two to four ounces of warm boric solution is injected into the bladder and the canula withdrawn, a lithotrite with the jaws locked and as large as the urethra will easily admit—force should *never* be used—is now introduced into the bladder, the operator standing on the right side of the patient; the stone is searched for with the lithotrite, and when found, the instrument (with closed jaws) is pushed on past the stone unlocked and the male blade gently withdrawn as far as the bladder will allow; the instrument is then gently rotated from side to side on its long axis, and the blades closed, and this manœuvre is repeated until the stone is caught and held—the floor of the bladder is thus carefully and gently explored in every direction—as Dr. Freyer graphically writes—"The surgeon should make a mental survey of the whole bladder and institute a methodical search in every part of it till the calculus is found;" the stone being now lightly held in the jaws of the lithotrite, that instrument is rotated, moved forwards and backwards, to make sure that the wall of the bladder is quite free, then locked and the stone crushed by gradual pressure exercised by the screw; there need be no great hurry in

actually crushing the stone; some stones are very hard, of a fine tough grain, and only slowly yield to the pressure of the lithotrite. When one of these hard stones is being dealt with, it is best to wait a few seconds after each tightening of the screw, giving the jaws of the lithotrite time to fully exert their pressure on the stone; all at once, perhaps during one of the intervals, the stone will give way, and the "crack" will be audible to those near the table. The reason for taking time in crushing a hard stone is, of course, to save the lithotrite from damage, for if owing to hasty pressure sufficient time is not given to the blades to fully act on the stone, they bend under the enormous strain and so become difficult or incapable of removal; a disaster I have heard of but fortunately never seen,—the fragments of the broken stone are then dealt with in a similar way;—if the stone is small it may be possible to break it all up at one introduction of the lithotrite; if large, the larger fragments are dealt with first. It is not advisable to go on crushing *débris* already sufficiently small to pass through the canula, because only a portion of a very finely crushed stone is heavy enough to drop from the to and fro current which is quickly passing from the bladder to the aspirator: then the largest canula which can be used with ease is passed into the bladder, a long narrow dressing tray having been placed between the patient's thighs and the fluid contents allowed to escape; my own procedure at this point, and which I much prefer to any other, is not to use a syringe or the aspirator for the purpose of injecting fluid into the bladder, but to insert into the open end of the canula a vulcanite sharp-pointed nozzle with stop cock, attached to a long rubber tube ($\frac{1}{2}$ inch diameter or less) communicating with an ordinary glass irrigator, full of warm boric acid solution (5 grains to 1 oz.) and hung on the wall five feet above the operation table. The advantage of this method is, in my opinion, that it is very rapid and easy, and by watching the fluid in the irrigator on the wall one can see the amount of fluid going into the bladder, and by its use after each crushing discoloured or sanguineous urine can be got rid of before the aspirator is applied; the tray between the patient's thighs catches the washings from the bladder together with fragments of stone, which can be collected; then when the fluid comes clean and clear and with a little residual fluid—say 2 oz. left in the bladder—the aspirator can be attached to the canula, and the fragments such as can pass down the canula, can be washed out. I usually have three aspirators in use at each operation; they are easily and quickly filled from a pail half full of warm boric solution, the fragments after each aspiration being emptied and collected in a basin. If other stones or large fragments are still present in the bladder, they are each in turn attacked,

broken up and removed by the aspirator; finally the bladder is injected with fluid, and a careful search made with the lithotrite for any remaining fragments, and after their removal the bladder is emptied through the canula of all fluid by gentle hand pressure over the bladder, and the patient sent to his bed.

If there is much cystitis, or if the patient complains of pain after the operation, hot poppy head fomentations are applied to the lower part of the abdomen, and ten grains of boracic acid in eight ounces of water are given by the mouth three times a day: the urine passed during the first twenty-four hours after the operation sometimes contains small quantities of fine sand or very small fragments of stone, left behind in the bladder, and probably held in the folds of the mucous membrane. Persistent pain is always treated by re-exploration of the bladder under chloroform, and will sometimes be found to be due to a fragment of stone still in the bladder, which should be removed by the lithotrite and aspirator in the usual way.

As a rule, the patient will be up and about on the day following the operation and fit for discharge on the third or fourth day, and often earlier.

REMARKS.—As far as I have been able to ascertain, the pressure on the walls of the bladder from the fluid of the irrigator five feet above the patient, is slight; about 2 lbs. to the square inch, and not sufficient to do harm; it is of course completely under the control of the surgeon, and ceases immediately the stop cock is closed.

Force is never used in passing a sound lithotrite or canula, and the greatest care is exercised in using instruments on children; plenty of oil should be applied to the instrument each time it is passed; I prefer the lubricant known as Lund's oil, and if the instruments—when well oiled—do not pass easily, I apply soap as well as oil to them. Some stones act on the blades of the lithotrite during the operation, the blades become dull and discoloured, often black, and cling to the urethra. Soap and oil will be found useful in such cases.

The lithotrite should always be locked before introduction or withdrawal.

The instruments preferred by me for performing litholapaxy operations are—Thompson's sounds, Freyer's lithotrites—made by Weiss and Son; Thompson's canula, slightly curved; Berkeley Hill's aspirator; the latter may not be the best, but from long use I much prefer it to any other, and I find it as effective as I could wish. When not in use the aspirators are kept filled with boric solution; six aspirators are always kept ready for use in the Mayo Hospital. After breaking a friable or soft stone, I do not think it necessary to always lock the lithotrite and apply the screw to each fragment; pressure exercised by the surgeon's hands through the handle of the

lithotrite is often quite sufficient to reduce the stone to coarse powder, and saves a considerable amount of time and energy.

There is a stone, common in Rajputana, and doubtless elsewhere, of very close grain of an orange-yellow colour and composed of urates; this stone is exceedingly tough and hard, and should not be crushed hurriedly, plenty of time being given to the lithotrite between each turn of the screw to exert its full power on the stone under pressure. Stone in some old men is often complicated with an enlarged prostate, and this may make the passage of the instruments

lodge there, and it may be necessary by means of a finger in the rectum to raise the bladder behind the prostate.

If I were asked what stones are most suitable for the operation of litholapaxy, I would say all stones which can be grasped by a lithotrite which enters the bladder easily. I have never yet come across a stone which, when fairly gripped by one of Weiss' lithotrites, could not be crushed to fragments; the size of the lithotrite to be used in any given case is governed by the size of the urethra, and not by the size of the stone, the largest lithotrite the urethra

A Statement showing the Results of Operations for Vesical Calculus performed in the Mayo Hospital, Jaipur, from 1881 to 1900.

YEAR.	CASES OF LITHOTOMY.		CASES OF LITHOLAPAXY.		Total cases.	SEX.		WEIGHTS OF STONES IN GRAINS.				MORTALITY PER CENT. OF CASES.		REMARKS.
	Cured.	Died.	Cured.	Died.		Male.	Female.	Lithotomy.		Litholapaxy.		Lithotomy.	Litholapaxy.	
								Largest.	Smallest.	Largest.	Smallest.			
1881	12	1	13	13	...	560	60	7.69	...	The average mortality per cent. of all lithotomy cases was 11.93.
1882	17	1	...	...	18	18	...	1,760	26	.....	.....	5.56	...
1883	7	1	...	...	8	8	...	560	60	.....	.....	12.50	...
1884	7	1	...	...	8	8	...	700	90	.....	.....	12.50	...
1885	15	2	17	17	...	1,290	14	11.76	...	The average mortality per cent. of litholapaxy cases 4.24.
1886	14	1	...	...	15	15	...	580	30	.....	.....	6.67	...
1887	14	1	2	...	17	17	...	750	15	60	15	6.67	...	
1888	8	1	8	2	19	19	...	566	40	440	30	11.11	20.00	
1889	3	2	21	1	27	25	2	3,408	120	656	20	40.00	4.54	Percentage of cases of stone in females 3.58.
1890	6	2	15	2	25	25	...	2,175	30	240	60	25.00	11.76	
1891	6	...	6	...	12	12	...	610	40	360	5	NH	NH	
1892	9	2	16	...	27	26	1	1,320	85	740	20	18.18	NH	
1893	9	2	26	4	41	40	1	1,920	242	1,500	8	18.18	13.33	Average number of days spent in hospital after lithotomy 27.31 days.
1894	3	...	18	...	21	20	1	480	150	515	13	NH	NH	
1895	13	1	19	1	34	31	3	2,580	40	660	5	7.14	5.00	
1896	4	2	31	1	33	38	...	720	180	1,731	12	33.33	3.13	
1897	4	...	23	...	27	26	1	1,440	180	600	10	NH	NH	Average number of days for last 5 years 6.61 days.
1898	1	1	34	...	36	36	...	135	25	1,030	12	50.00	NH	
1899	3	...	43	1	47	43	4	360	100	1,080	4	NH	2.94	
1900	1	...	22	...	23	23	...	...	.....	1,250	5	NH	NH
TOTAL	156	21	284	12	473	460	13	Average weight of largest.	Average weight of smallest.	Average weight of largest.	Average weight of smallest.	11.93	4.24	Up to 15th June 1900.
								1153.4 grains.	80.4 grains.	778. grains.	11.7 grains			

difficult; as a rule, the larger sized canula and lithotrites can be passed in these cases, if, when the prostatic obstruction is met, the handle of the instrument is depressed between the patient's thighs and then rotated, the entry to the bladder is generally easily made; these cases sometimes bleed freely, the hæmorrhage does not appear to be harmful; careful search immediately behind the enlarged prostate should be made for the stone or its fragments as they are very apt to

will easily admit is the best size to use, provided it will grip and hold the stone. If the urethra will not admit a lithotrite large enough to crush the stone, then it is best to do a lateral lithotomy, and if the stone is diagnosed to be too large to be extracted whole through the perineum, then I would make a small median incision, on a lithotomy staff through the perineum into the bladder, sufficiently large to admit a lithotrite big enough to deal with the

stone which I would then crush and evacuate through the perineal wound; the bladder can be made to hold a sufficiency of water if an assistant presses the margin of the wound against the instruments, and the operation would in some respects be similar to litholapaxy in a female.

To crush a large stone with a small lithotrite, or to crush some large stones with any lithotrite, will often mean a considerable expenditure of time and physical effort, and is often a severe strain on the physical powers of the surgeon, who will find it well worth his while to see that his operation table is of a suitable height, and that it is not too low or causes him to stoop too much over his patient. I have often found it advisable to protect my hands with a towel when crushing a large or hard stone—the locking buttons on Sir Henry Thompson's lithotrite—and especially a flat sliding button on some of the earlier lithotrites, will often severely punish the hands of the surgeon, when working for a considerable time on a big or hard stone; and I consider Bigelow's and Freyer's lithotrites to be much the best in this respect and much more comfortable to use.

It is a good plan to unscrew and separate all the component parts of a lithotrite after each operation, to thoroughly clean and oil all the parts in the handle and to burnish the blades; this is always done in the Mayo Hospital, Jeypore, by the House Surgeon, and the lithotrites are brighter and cleaner and more free than when first received from the maker.

The statement which accompanies this paper shows the amount of surgery for the removal of vesical calculus done at the Mayo Hospital since 1881.

Excluding five cases of lithotripsy done during 1883-1889—four of which were in females—473 operations for vesical calculus were performed in the Mayo Hospital, Jeypore, during the period 1881-1900. Of these, 177 were done by lithotomy with 21 deaths, and 296 by litholapaxy with 12 deaths. The figures show a varying but steady increase in the numbers yearly operated on for stone, which points to an increasing appreciation amongst the people of this State, and is doubtless due to improved methods and results; the statement also affords an excellent example of the fact that Bigelow's operation of litholapaxy has almost completely superseded the older operations of lithotomy and lithotripsy in Jeypore. Some very large stones were successfully removed by Colonel Hendley by lithotomy—stones weighing 4 oz. 7 drams, 5 oz. 6 drams, and 7 oz. 5½ drams: the weight of stones removed by lithotomy varied between 14 grains and 7 oz. 5½ drams, and those removed by litholapaxy ranged from 4 grains to 3 oz. 7 drams. The fragments of stones removed by litholapaxy were weighed when quite dry.

The mortality per cent. of all cases of lithotomy was 11·93, and of all cases of litholapaxy

4·24. Of 175 cases of litholapaxy done during the past five and-a-half years the mortality per cent. was 1·71—a death after litholapaxy occurred in May 1899, and was preceded by 62 successful cases, since when we have done 48 litholapaxies without a death.

The ages of the cases operated on by lithotomy ranged from two to 75 years, and the ages at which the largest numbers were operated on ranged between five and ten years.

In the cases operated on by litholapaxy the ages ranged from seven months to 80 years, and the ages at which the largest numbers were operated on ranged between three and seven years, which goes to prove that children are brought earlier for operation now than the operation of litholapaxy is established and known to give such good results.

Counting five cases of lithotripsy not included in the statement, there were in all 478 cases of vesical calculus, of which 17 were in females = 3·58 per cent. in females and 96·42 per cent. in males.

The average number of days spent in hospital after operation by the lithotomy patient was 27·31 days, and by the litholapaxy patient 7·87 days, and for the last five years 6·01 days.

The operation of litholapaxy is like many other surgical operations which require special aptitude, manual dexterity, and experience; and that surgeon will meet with the greatest success in this particular branch of surgery who adds deft hands and fingers to experience, and who bestows the greatest care on the smallest details; if in addition he has a liking for mechanics and carpentry so much the better.

Regarding the operation of lithotomy there is little or nothing now to be said, and the subject is fully treated in all first-class surgical works.

In India in all hospitals possessing a proper and full equipment of litholapaxy instruments the operation of lithotomy is falling into disuse, being superseded by a far better and more scientific rival; only those cases which from some very uncommon cause cannot be operated on by litholapaxy are now relegated to the older operation.

Lateral lithotomy is in my opinion the best operation when it is necessary to do a cutting operation at all, and if the stone be so large that the surgeon has doubts of successfully extracting it through the perineum, then I think the best thing he can do is to make a small median perineal incision on a grooved staff into the bladder, sufficiently large to admit a lithotrite big enough to crush the stone, the fragments of which should be removed by a large canula and aspirator exactly as one would operate by litholapaxy in the female.

Before the days of litholapaxy, lithotomy was remarkably successful in India, especially in boys,—now the operation hardly gets a fair chance as only a very few cases are left to it in those hospitals where litholapaxy can be done.

Since the above was written I have had to deal with an accident which is as rare in litholapaxy as it is formidable, and, as it is of much interest, I append a short account of it.

On the 9th July I proceeded to operate on an old man, aged 80 years, a Hindu, who had been suffering from stone for four years. He was very thin and in a bad state of health. His bladder was very irritable and would admit only a very small quantity of injected fluid; his urethra was large and easily admitted a No. 16 canula. After injecting about 2 ounces of fluid I introduced a No. 12 lithotrite and caught the stone in its short axis; the stone was not large and well within the grip of the lithotrite. On locking the instrument and applying the screw I noticed that considerable crushing force was being applied to the stone, so much indeed that I had to use a towel to protect my hands. I remarked on the hardness of the stone and the great force I was applying to my house surgeon, who suggested that I should withdraw the lithotrite and use a more powerful one. I now regret extremely that I did not follow his advice. I increased the crushing force very slowly and deliberately, having the greatest confidence in the strength and capability of my lithotrite. At last the sudden and peculiar noise of a breaking stone was heard, and I believed all was well. On further manipulation of the instrument I found, however, that all was not well; the blades were partially jammed and I suspected that they were bent. After a careful examination per rectum I found that the female blade was broken at its extremity and bent almost at right angles to the male blade to the right for $2\frac{1}{4}$ " of its length, and that the divergence between the two blades was fully $1\frac{1}{4}$ " inches. This was a formidable dilemma to find oneself in, and the question, of course, was how to get the instrument out with the least danger to the patient. The bladder was empty and I had no means under the circumstances of injecting it. I decided on a perineal incision; and, with the blades of the lithotrite to guide me, I without difficulty entered the bladder and extruded the bent ends of the lithotrite through the perineal wound. It was then my intention to cut through the extruded blades with a file, but I found that with a strong pair of bone forceps I could wrench off the bent portion of the female blade, which I did. I then withdrew the lithotrite backwards through the wound and the urethra in the ordinary way. The stone was then removed by lithotomy forceps. It showed plainly where the lithotrite had gripped it on opposite sides of its short axis. It was not fractured or in any way broken, and, except for the dents made by the jaws of the lithotrite, was whole. It weighed 1 oz. 120 grains, and measured in the long axis $1\frac{3}{4}$ " and in the short $1\frac{1}{4}$ "; it is composed of urates. The neck of the bladder was injured by the lithotrite and there was

considerable bleeding. A lithotomy drainage tube was introduced into the bladder and the perineal wound plugged. The tube was removed after 48 hours, when the bleeding had ceased. The wound was healthy and the urine flowed freely from it.

The lithotrite had been in use about two years and had crushed many and much larger stones than the one which broke it, and was made by, in my opinion, the best surgical instrument maker in London.

The unfortunate result was entirely due to my own fault in persisting in applying a greater strain than the instrument could bear. While I was applying the screw and gradually increasing the crushing force of the instrument, I noticed that each turn of the screw showed that the jaws of the lithotrite were *apparently* approximating, and this went on for several turns, and yet the stone did not yield; this should have been sufficient warning that the blades were giving to the strain and probably either bending or breaking, and should have caused me to stop using the lithotrite and to substitute a more powerful one for it.

The old man, so far (14th July), is making good progress to recovery.

LITHOLAPAXY AND ALLIED OPERATIONS.

By RICHARD BAKER, M.A., M.D.,
MAJOR, I.M.S.

A GREAT deal has been written in support of the various theories propounded to account for the prevalence of stone in certain countries, and in certain parts of those countries; and it is doubtless proper that a paper on the subject of the modern methods of dealing with calculus in the bladder, should touch, however lightly, on the subject of its causation.

The writer is much impressed with the probability of its distribution and prevalence being due to drinking water and to the presence therein of lime salts—which we know are much less soluble than either potash or soda salts.

Local considerations in Sindh give colour to this supposition—for in the development of the irrigation system in that province, by which Indus water, highly impregnated with lime salts, is conveyed to distant villages; and is there used not only for irrigation of the land, but for drinking purposes; to the exclusion of the well water used before the irrigation period—such introduction has been found to be followed by a large increase in the cases of stone from these villages and districts. The writer regards the prevalence of stone in Upper India as due to similar if not always identical causes, and the fact that the stone regions in Upper India and in Mesopotamia and Kurdistan—where the writer has served—are practically confined to the

drainage areas of rivers; and those mostly, if not all, "limestone" rivers—is another proof to the writer's mind that water drunk is the cause of calculus formed.

It will be objected that the nucleus of nearly every stone is uric acid; but there can be little doubt that many such nuclei are daily voided in conditions not far removed from health; and that the formation of a stone, *i.e.*, a deposit around this nucleus in sufficient quantity to form a concretion that cannot be passed unconsciously in the stream of urine, will be found to be dependent upon the ingestion of water holding lime salts in solution, or as it may be, in suspension.

Like many others, who have had a favourable experience of lithotomy in this country, the writer was inclined on the introduction of litholapaxy, and especially on the extension of that operation to the cases of boys; in whom lithotomy had given such good results; to view the change with a certain degree of distrust—not as to the immediate relief afforded—but as to the completeness with which the crushed *débris* could be evacuated; and he felt that it was at least possible that any defect in the direction of incomplete evacuation might lead to the recurrent formation of a calculus; having for its nucleus a residual fragment of the stone already dealt with by litholapaxy.

A more extended experience, however, especially during his tenure of the Civil Surgeoncy of Hyderabad-Sindh, has completely dispelled these doubts; and it is difficult to imagine how such a prejudice can continue to exist in the mind of any surgeon who has had sufficient opportunity of testing the modern procedure and of fairly judging its results.

In Hyderabad, indeed, where the work of the writer's two immediate predecessors—Keith and Henderson—had done so much to establish confidence in litholapaxy, it would have been difficult, it is believed impossible, to have returned to the old order of things, so popular had the crushing operation become,—while the fame of the civil hospital there as a place for obtaining relief by means of the "engine,"—as the lithotrite was termed by most of the patients, had spread so widely as to have induced sufferers, not only from Sindh but from Beluchistan, and from beyond the desert of Rajasthan, to seek admission there.

The writer's experience of the operation in Sindh extended over some 420 cases in thirteen months, and his entire experience in this line, including cases in other hospitals, and in private amounts to some 500 cases altogether; not large, compared with that of other workers—notably Keith—who was Civil Surgeon at Hyderabad for some years; and whose operations must be counted by thousands.

The details of the operation itself are so well-known in this country as not to need

any description here, but a few of the points connected therewith, which seem to impress themselves upon the operator as, at any rate, conducive to success, may be here mentioned.

The bladder having been washed out before *anæsthesia* is complete, so as to render the washing out more or less automatic, owing to the continuance of contraction of the organ, and a sufficiency of fluid retained, the lithotrite well oiled, can generally be introduced without difficulty—incision of the meatus being only occasionally called for.

The writer operates with the patient tied up in the lithotomy position, which renders the base of the viscus readily accessible to the lithotrite, and the most likely position in which to find the stone.

Crushing of the stone or of large fragments is done at or immediately over the base of the bladder.

The shank of the instrument should be well elevated; and on opening and closing the blades once or oftener the stone will, as a rule, be found to be fairly grasped.

Difficulties at this stage may be due (1) to the presence of a large calculus, which is readily touched, but grasped with difficulty; (2) to its shape, owing to which it may present its long axis to the gape of the instrument; (3) to its extremely small size, which may render it difficult to find; and (4) to sacculation of the bladder, the stone being situated in the sac.

An example of the last condition,—of rather a curious kind occurred to the writer—the stone could be readily touched with the lithotrite at the left base of the bladder, but to grasp it was impossible. A glance at the perineum showed the scar of an old lithotomy, and examination per rectum disclosed the presence of the stone in the tissues of the perineum beneath the scar—a case of healing over after an incomplete operation by a native *hakim* some years before.

The stone was cut down upon and removed without difficulty. The upper end of stone was found to have projected into the cavity of the bladder.

A large calculus can be dealt with in various ways (1) by hammering down the male blade upon it, the screw mechanism having been put out of gear—a method which needs to be carried out with caution—not being devoid of danger both to patient and instrument, but one nevertheless which, if cautiously done, is often very quickly successful; (2) by nibbling at the edges of the stone till it is sufficiently reduced in size to be fairly grasped. This is tedious and need much care in its performance, as the bladder wall is in some danger; and failing these, either (3) supra-pubic lithotomy, or (4) what has been described by operators at home as perineal litholapaxy—a term which the writer considers misleading since it is merely crushing with a

large instrument through what is practically a lithotomy incision, and entails quite as long a stay in hospital as a lithotomy proper.

At the same time it is an open question to the mind of the writer whether in dealing with the very largest stones, this method, with its consecutive dependent bladder drainage, is not destined to replace the supra-pubic method.

The operation introduced by Keith which is known—in Hyderabad at least—as perineal litholapaxy, is on quite different lines, and called for in quite different circumstances, *viz.*, where the stone can be crushed but where either no lithotrite at all; or no lithotrite sufficiently powerful for the purpose, can be introduced per urethram.

In such cases Keith introduced a staff with a median groove into the bladder and hit off this groove with a narrow bladed knife through the floor of the membranous urethra, the finger in the rectum being used as a guide if necessary. Along the groove and into the bladder he successively passed (1) a probe, (2) a director, (3) a female catheter, and (4) a lithotrite—each instrument being withdrawn as its successor was introduced. The stone was then crushed and evacuated in the usual way, and if no stricture exist, or if it has been dealt with (as it readily may be) at the time, the little fistula heals in from forty-eight to seventy-two hours. Indeed, in the case of very small children, no urine at all is found to flow through the little incision; and even immediately after the operation fluid injected into the bladder is found to return by the meatus; and not through the wound which closes at once.

The writer found that as soon as he was provided with a Weiss No. 5 fenestrated lithotrite of Keegan's pattern, the number of cases in which this operation was called for owing to the small size of the infantile urethra not admitting of the performance of the usual operation, was very small indeed only one such having occurred to the writer of the total of nineteen altogether performed by him. This, however, in no way detracts from the value of the operation when called for in such cases; or in other cases, such as stricture in adults, precluding the possibility of operation per urethram where it is obvious that this method gives rest to the urethra and avoids the exposure of the divided surface of the stricture (where this has been effected) to contamination from altered and unhealthy urine, for some days after the operation or longer, if considered necessary a canula being introduced through the wound and retained in the bladder.

Before leaving the subject of large stones, it is right to notice the instrument introduced by Mr. Milton, of Cairo, who has with it crushed a calculus weighing 12 oz. It consists of a crusher and evacuator in one, the gape being extremely wide, and appears to the writer to

have two defects; one, that a wide gape will not ensure a firm grasp unless the blades are proportionately lengthened, and another, that when used as an evacuator, it presents to the collapsing bladder wall the serrated surface of the blade which is continuous in structure with the evacuating canula forming the shank of the combined instrument.

Mr. Milton did the writer the honor of sending him an exhaustive pamphlet on the whole subject, and he appears to believe that no stone is too large or too hard to be crushed.

This, if the operation of Harrison of crushing through a large perineal wound be included, is no doubt true; but, as regards litholapaxy proper, it has struck the writer that a good deal of Mr. Milton's confidence may be the outcome of his local experience, since in Egypt a large number of cases of calculus is found in patients with chyluria, and it is possible that a calculus deposited in a medium of this consistence is more readily crushed than if deposited in a bladder containing clear urine. Further, the bladder in most cases of chyluria contains much pus; and a calculus formed under such conditions would probably be largely phosphatic.

A method by which the evacuation is rendered rapid and easy; and the whole proceeding sometimes much expedited, is that for which I can think of no better name than "Tamping,"—the stone having been fairly broken up—the lithotrite is put off the screw, the female blade resting on the base of the bladder, a series of rapid closures is made, the instrument being moved a little from time to time to find fresh fragments. Should one be met with too large to crush without the aid of the screw, it is the work of an instant to put the screw action in gear, and crush it in the ordinary way; then put it out of gear again, and proceed as before. This method looks dangerous, but if the shank of the instrument be properly elevated, it is perfectly safe—in fact it is quite impossible to engage the fixed base of the bladder in the jaws of a lithotrite so held.

Before leaving the question of crushing, the writer would mention an experience he has not seldom met with, and on occasions shown to others, generally when using a small lithotrite and always in dealing with a small fragment of stone.

It is a sensation on grasping such a fragment as of grasping a fragment of steel, and one which brings a conviction to the operator's mind that any persistence will result in damage to the instrument.

On gently opening the blades, and moving them so as to alter the line of compression, the fragment yields at once, when the screw is put in action.

It has appeared to be dependent in some way on the stratification and consequent axis of cleavage of the fragment—at any rate this is the

only explanation of the phenomenon that has occurred to the writer.

As to evacuation, it goes without saying that the larger the canula that can be introduced, the less minute need be the crushing; and information on this point will have been obtained in passing the canula for the preliminary washing out and filling of the bladder.

If the anæsthesia is relaxed just before proceeding to evacuate, it will be found advantageous for reasons already given.

The use of the evacuating pump is general—though some surgeons are satisfied to empty the bladder by repeated injection through, and manipulation of, the canula—supplemented—in cases where there is a large quantity of *débris*—by the use of a finger in the rectum. Mr. Jacob, the Assistant in the Civil Hospital at Hyderabad, who has probably witnessed more operations for vesical calculus than any man living, is quite an expert at this phase of the operation.

The use of the pump, however, affords another means of ascertaining whether a fragment has been left behind; as it will reveal its presence by clicking against the eye of the canula. To make certain of this, it is a safe practice to use the sound at the close of the operation.

There is probably no surgical procedure so uniform in its means and methods that varies more in its difficulty in different cases; but, on the whole, the writer is not one of those who are inclined to overrate its average degree of difficulty to an operator of experience in such cases.

The results are good, extremely good, on the whole, and the operation in the majority of the cases is one of a striking character in the almost instantaneous cure of a condition of great gravity.

The writer has met with some disappointment when least expected, notably in the rapid death with suppression of urine of a child, whose case during operation by the perinæal method presented no difficulty.

He has also met with accidents—the lithotrite breaking in the bladder, necessitating its removal by perinæal incision.

On reviewing his experience, he is inclined to regard the occurrence of anything approaching serious or persistent hæmorrhage at or after the operation as the condition which portends the most serious results.

A moderate degree of cystitis is to be expected after most operations where the stone was large, and especially where its surface was rough; while cases of small calculi in children may be said to be cured instantly by the operation performed with due care, there being no after-symptoms of any kind.

The rule followed by the writer is, when in doubt as to after-treatment, where, as occasionally occurs, cystitis is excessive, to open and drain

the bladder through the perinæum and he has never had occasion to repent having done so in cases where he considered it called for. This, of course, is rarely necessary. It does not, however, result in a condition like that left after lithotomy, a small median cystotomy and the introduction of a large silver canula being all that is requisite.

A small quantity, 4 oz. or so, of boric solution is left in the bladder at the end of the operation—the patient, if the operation has been at all prolonged, put to bed between blankets, given a dose of quinine and opium, and thereafter a little barley water from time to time; but in cases of small calculi in children the little patient may often be seen playing about on the ward floor immediately after recovery from anæsthesia, so complete is the absence of any traumatic disturbance then or later.

I append a summary of 404 cases published in two series (of 200 and 204 each) in the *Lancet* of October 10th, 1896, and September 11th, 1897, the results being combined.

Mussalmans, 341; Hindoos, 63; Males, 395; Females, 9. Ages—Under one year, 1; one to ten years, 183; eleven to fifteen years, 13; sixteen to forty-five years, 103; forty-six to fifty-five years, 67; fifty-six to sixty-five years, 30; and over sixty-five years, 7. Oldest, 78; youngest, 8 months.

Lithotrite—Average number of times introduced in each operation, 1·81.

Average duration of operation, 15 minutes 55 seconds; average weight of stone, 2 drachms and 50 grains; largest, 3 oz. 2 drachms 10 grains; smallest, 2 grains.

Mortality, 3 deaths in 404 cases, representing 0·742 per cent.

STONE IN THE BLADDER— OPERATIONS FOR.

By J. A. CUNNINGHAM, M. D., M. CH.,

MAJOR, I. M. S.,
Civil Surgeon, Delhi.

IN a criticism which appeared in the *Lancet* of 31st March 1900 (page 964), I stated the opinion that to subject a patient with a small stone in his bladder, if uncomplicated, to a cutting operation, particularly to supra-pubic lithotomy was retrograde surgery.

It is now more than twenty years since Bigelow advocated and proved the safety of crushing and removing a stone at one sitting. Amongst British surgeons for almost the same period this operation named by Bigelow "litholapaxy" has been practiced on a large scale in India and other Eastern countries, and to a limited extent, and chiefly by specialists, in England.

The literature on the subject, during the past fifteen years, has been sufficiently copious and

of such a nature as to convince the most sceptical as to the merits of this operation.

In at least three instances to my knowledge medical officers in India have published series of over one hundred consecutive litholapaxies without a death. Whilst the mortality in the hands of all Indian litholapaxists was 3.96 for a period of five years ending 31st March 1895 and embracing 10,073 operations.

Compare this with a mortality of 11.02 per cent. in 7,201 cases of lateral lithotomy, and 42.17 per cent. in 147 cases of supra-pubic lithotomy for the same period and by the same operators.

These figures were collected by Brigade-Surgeon Keegan from official medical reports and comprise all the operations of these classes performed in the Punjab, North-West Provinces and Oudh, and in the Bombay Presidency for the five years ending 31st March 1895.

It should be remarked that these figures of relative mortality of lateral and supra-pubic lithotomy require some explanation. The lateral lithotomy death-rate is low, and is so chiefly on account of a large proportion of children being included in the number operated on, this operation in children has always been attended with a low mortality.

The cause of this large proportion of children being so operated on was that at that time owing either to want of experience or for want of the necessary instruments surgeons, who subjected their adult stone patients to litholapaxy, cut their children patients.

A similar explanation will account for the unusually high mortality amongst the supra-pubic cases, *viz.*, that these 147 largely represented those who from excessive size of stone, or unfavourable complications were not suited for litholapaxy, and such cases no matter how dealt with would be attended with a high death-rate.

Were it not for the operation of these special causes the death-rate in lithotomy at all ages would be somewhere between 11 and 42 and probably near 25 per cent., a very high figure as compared with 4 per cent. in litholapaxy.

A low death-rate is only one of the many advantages which litholapaxy possesses over lithotomy, and it is hardly credible that an enlightened surgeon could be found in the present day in the face of this evidence, not only to perform supra-pubic lithotomy, as an operation of election, for a small and uncomplicated stone, but to publish the case that the world may see what he has done.

At the same time it is a question whether with the limited opportunities afforded in England of acquiring experience in this line, the ordinary hospital surgeon can ever hope to become a proficient litholapaxist.

I fear not and that he will be driven to selecting one of these more fatal and unsuitable

operations, or to handing his patient over to a specialist to be dealt with.

In my experience about 95 per cent. of all the cases met with in India in men, women and children are suitable for the crushing operation, the proportion would probably be about the same in Europe, where, although, there would be fewer exceptionally large stones met with, there would in all probability be a larger proportion of exaggerated prostatic cases to equalize matters.

I propose now giving a description of the operation of litholapaxy as practised by me, and afterwards discussing the cases not suitable for this operation and indicating how, in my opinion, they should be dealt with.

Preparation of patient—although in this country owing to their impatient and erratic habits we are frequently obliged to subject our patients to operation immediately they present themselves, it is very advisable whenever possible to subject them to a preparation of from one to three days, or more if there be cystitis or irritability of the bladder. In most cases a hot bath with some phenyle in it and a good scrubbing with soap, will be beneficial.

In all cases where there is not already diarrhoea the bowels should be cleared out with a purgative given the night before, and the rectum washed out by an enema on the morning of operation.

If cystitis be present, the patient should be confined to bed, the bladder should be washed out by warm boracic lotion, and a mixture containing hyoscyamus, buchu, and an alkali should be administered.

It should always be remembered that patients with large stones in their bladders are generally debilitated, and should be carefully prepared for operation when possible by both nutritious diet and suitable medication.

The larger the stone the more prolonged will the operation be and the larger the quantity of chloroform consumed. So to counteract the evil effect of these adverse influences everything that foresight can suggest should be done to improve the condition of the patient. In practice it is frequently found, however, that the patient's bladder is so irritable that he is able to retain no urine in it, but is constantly tortured by a desire to urinate, with constant straining, so that rest or sleep is impossible. In such cases, however weak the patient may be, the operation should be undertaken as soon as the rectum can be washed out, as this is the only way his suffering can be relieved.

The anæsthetic I generally use is chloroform for operations of short duration, and for prolonged operations chloroform till the patient goes under, and then A. C. E. mixture to keep up anæsthesia.

As soon as the patient is ready I pass a well lubricated full-sized steel round with a tapering

conical point to explore the urethra, and, if necessary, overcome any constriction or obstruction that might arrest, or make difficult to pass the less favourably shaped lithotrite or canula.

I then draw off any urine there may be in the bladder, and if this smells badly or contains mucus, I wash out the bladder and inject about four ounces, more or less according to circumstances, of warm boracic acid solution, to protect the bladder walls during the crushing process.

The lithotrite I prefer is that shown in the illustration (Fig. 1).

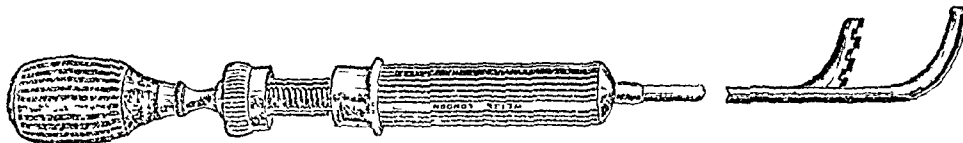


Fig. 1.

It is a combination of Sir Henry Thompson's fully fenestrated blades and Bigelow's handle and locking action. These instruments are still made by Weiss with great perfection. No other maker, whose instruments I have seen, has succeeded in mastering the many difficulties encountered in making a really good lithotrite. It should be cut out of a solid block of the best steel, and with a minimum of material should possess the maximum of strength. The bend of the blades should be such as to facilitate the catching of a stone, or its fragments, and prevent them slipping away during the approximation of the blades. There should be no

a minor consideration, I would prefer the olivary handle in all lithotrites.

As to the number of lithotrites necessary, it is advisable to have a complete set, from the largest to the smallest, whilst at least two (the most commonly used) should be in duplicate.

For adults three sizes will generally suffice, Weiss's A. B. and another about No. 14 at the blades and 12 at the shank. B. should be in duplicate.

For children Nos. 5, 6, 7, 8, 10 will be required, No. 6 in duplicate.

In experience I sometimes find, especially in

children's lithotrites, that the length of grip given is not sufficient. I now always when ordering lithotrites specify the length of grip which I require, taking on myself all responsibility regarding the force to be applied to them, and the danger of their breaking under it.

It is advisable before removing the lithotrite to crush as much of the calculus as possible, so as to minimise as far as possible the number of reintroductions.

Difficulty is sometimes experienced in seizing the stone in the blades of the lithotrite; this difficulty is increased in cases where an irritable bladder will retain no fluid, and where the

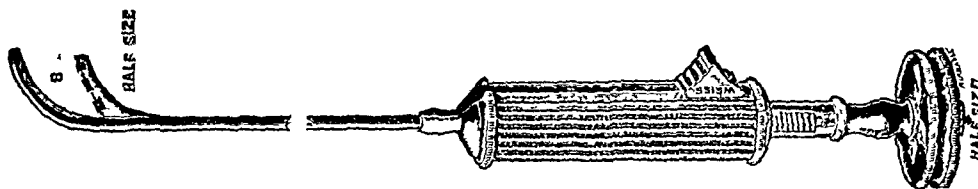


Fig. 2.

sharp angles or corners where the blades are fenestrated. I have seen the edge so sharp on the convex border of the female blade in some lithotrites that these would scratch or wound the mucous membrane of the base of the bladder, if passed with pressure over it.

The difference in facility of use between a lithotrite with properly curved blades and another of a less perfect pattern is very soon experienced in practice, and especially when a small lithotrite is being used on a child.

I generally use the same pattern of lithotrite for the child as for the adult; a saving of about £1-10-0 can be effected in the cost of each instrument, by having the wheel handle and sliding action of Sir H. Thompson (Fig. 2), substituted for that of Bigelow. The wheel handle, although it does not give so much power as the olivary handle, generally gives sufficient mechanical power to crush easily the stones found in children's bladders; but if cost were

hypertrophied walls of the organ contract on the stone and the lithotrite.

The stone may also lie in a pouch of a sacculated bladder or behind an enlarged prostate, or a bladder tumour may get in the way, and render the operation a difficult one.

In simple uncomplicated cases there is generally no difficulty experienced, but a few simple precautions are always necessary.

On seizing the stone this should be brought to the centre of the bladder before any crushing force is exercised. In order to keep the blades in a safe position while crushing the left elbow joint flexed should be firmly fixed against the left side, and attention should not be removed from the left hand whilst force is applied by the right. I am of opinion that injury is often inflicted by beginners on the bladder in failing to practise this precaution.

If any doubt exists as to whether a portion of the bladder or of a tumour are gripped

together with a stone, this can be dispelled or confirmed by drawing the locked lithotrite forward and rotating it in the bladder.

Having finished crushing, the largest canula (Fig. 3) that the urethra will admit is to be passed, being previously, like all instruments, passed into the urethra, well lubricated. In a few cases No. 20 can be used, No. 18 frequently, and almost always No. 16 at least. The canula should now be connected with the evacuator, and all the crushed fragments removed by a series of regular compressions of the India-rubber bulb. Before withdrawing the canula a full-sized stilette with a flexible end should be introduced into it to drive out any fragment that may be lodged in the opening. I have seen the urethra unnecessarily injured by drawing out a canula in which a sharp projecting fragment was so wedged.

The evacuator which I prefer, is Bigelow's (Fig. 4). In this the glass receiver is immediately underneath the India-rubber bulb, and the fragments of stone on returning with the return flow drop at once by gravity into the receiver where they remain undisturbed when the fluid is again forced into the bladder. Any evacuator which does not embody this principle will be found more or less unsatisfactory in use.

The chief precaution to be observed during evacuation has reference to the manual pressure applied to the bulb. A diseased bladder, or the attenuated bladder of a weakly child, might easily be burst by overpressure. It is generally advisable to have a small quantity of extra water in the bladder beyond what fills the evacuator; an ounce would be sufficient. In some cases where the bladder is irritable, contracted, and has hypertrophied walls, a small quantity of fluid only can safely be forced into

The last few particles of stone which remain in the bladder and are too large to pass through the canula generally make themselves very plainly evident by clicking against the eye of the canula when the bulb is relaxed.

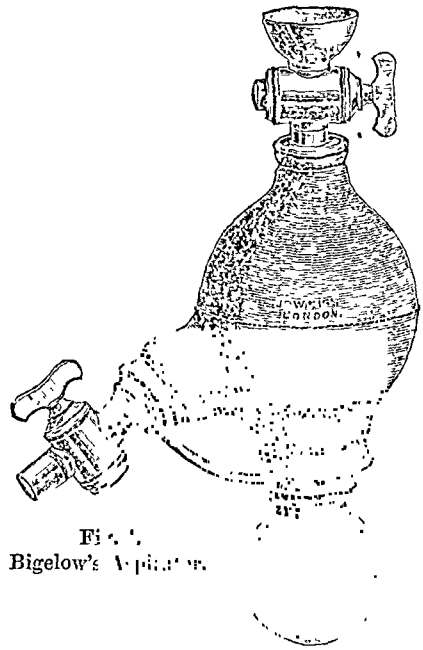


Fig. 4.
Bigelow's Aspirator.

The clear free thrill of the fluid, as it rushes back into the bulb grasped by the hand, when all particles have come away and the current is not interrupted, is generally very distinctive, and only very rarely when this clear thrill is experienced will any particles be found to remain behind.

After the evacuation of *débris* is complete I, wash out the bladder with acetate of lead lotion, strength 10 grains to 1 ounce. I have a dose of quinine and opium administered, and generally

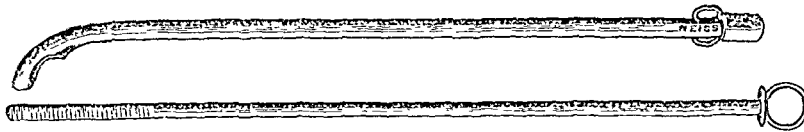


Fig. 3.—Evacuating Canula and Stilette.

the organ at each compression, but in these cases a small quantity suffices to remove the *débris*.

During the processes of crushing and evacuating, it is necessary to have the patient completely under the anæsthetic.

A single crushing and evacuation may suffice to remove entirely a small or moderate-sized stone in an adult; but large calculi, and those of any size over 20 grains in children, may require several reintroductions before they are completely crushed and removed.

In the case of children and adults with healthy bladder and prostate there should be no bleeding at all; but in cases of diseased prostate or bladder, a considerable quantity of blood may be lost during the operation.

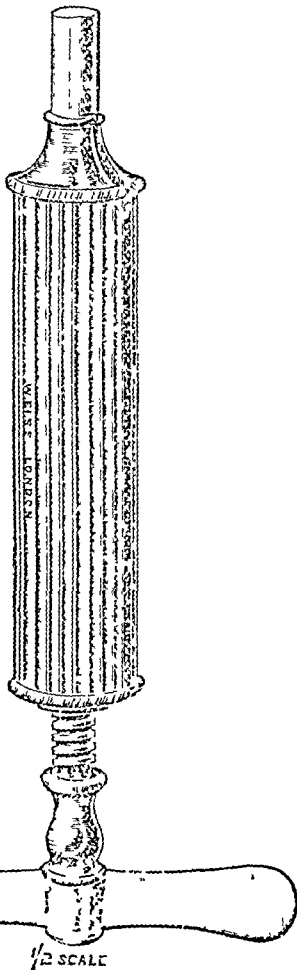
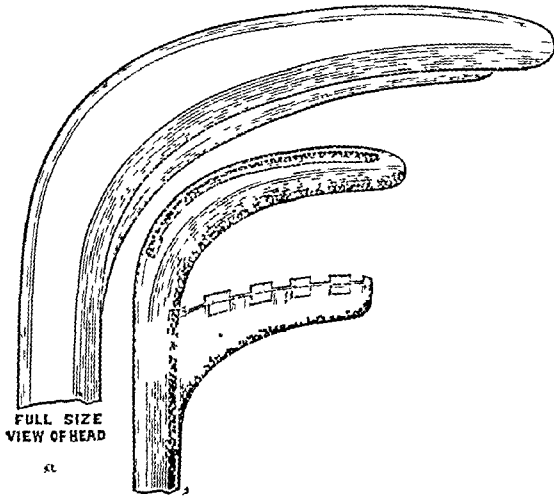
have the genitals and perineum fomented with poppy head decoction.

The operation of litholapaxy in children requires a light hand, and abundance of patience, and generally plenty of time, as the fragments have to be crushed very fine to enable them to pass through the small canulæ admissible.

Children's bladders are very frequently irritable, and will retain no fluid which adds to the difficulty of crushing.

There is one experience peculiar to the urethra of the male child which it is important to remember, *viz.*, that if the smallest available lithotrite or canula passes with some difficulty, actually distending the urethra on its first introductions, this same instrument will pass

with more and more difficulty each time it is reintroduced, just the converse of what happens in the adult. In such a case it is advisable to crush the stone thoroughly before removing the lithotrite rather than adopt the plan of repeated crushings and washings.



Litholapaxy in the female is particularly easy and simple; the largest sized instrument can generally be used. Speaking generally the operation (litholapaxy) is easy or difficult in ratio to the size of lithotrite that can be em-

ployed, and a beginner should avoid acquiring his first experience on children.

I now proceed to the consideration of the conditions which may render the operation of litholapaxy difficult or even unsuitable and to indicate shortly how such cases should be dealt with.

(a) A stone may be so large that the largest lithotrite capable of passing through the urethra fails to lock on it. These cases used to be subjected to suprapubic lithotomy and were attended by a high mortality. Brigade-Surgeon Keith, I.M.S., Civil Surgeon of Hyderabad, Sindh, devised a means of removing these monster calculi which will, I anticipate, reduce the mortality to a very low figure when it comes to be generally applied.

Keith's operation* is designated "perineal lithotomy" and consists in making on a lithotomy staff a perineal wound into the bladder large enough to admit easily the index finger. Through this wound is passed a very large and powerful lithotrite capable of crushing a stone the size of a foetal head.

The fragments being crushed, they are removed through a large canula passed through the same wound.

(b) A calculus may be so hard that it is impossible to crush it with an ordinary lithotrite. I have met one such. This, if of small or moderate size, might be removed through the perineum by lateral lithotomy; and of whatever size, if in the operator's opinion it can be broken up by the giant lithotrite, perineal lithotomy should be resorted to rather than supra-pubic lithotomy.

(c) There may be such narrowing of the urethra as prevents the passage of crushing instruments. If this occurs, as it sometimes does in young children, lateral lithotomy or perineal lithotomy should be done.

If in an adult, and the obstruction is due to a stricture, the urinary passages being in a fairly healthy state, internal urethrotomy might be done and litholapaxy afterwards proceeded with. But if extensive urethral or vesical disease exists with a devious sacculated canal, or if urinary fistulae exist, then lateral lithotomy or perineal lithotomy should be resorted to.

(d) The bladder may be extremely irritable with hypertrophied walls, so that no fluid can be retained, and the desire to micturate is almost constant. In such a case an expert might safely crush and remove a stone, but the risk is considerable, and it is questionable whether it would not be wiser to remove the stone through a small perineal wound and give the irritable bladder the advantage of complete rest by drainage.

(e) The bladder may be sacculated and have completely or partially lost its contractile power,

* I. below, p. 327.—Ed., I.M.G.

a quantity of residual urine will remain and decompose, cystitis will occur; this is another condition calling for a perineal opening to drain, and give rest to the bladder. These cases generally occur in old people and are frequently associated with enlarged prostate. If the central lobe of the prostate be chiefly involved, and this projects into the bladder, constituting the chief barrier to urination, then suprapubic lithotomy should be performed, and the offending prostatic lobe removed at the same time.

(f) The stone may be associated with a tumour of the bladder which it is desired to remove at the same time. In this case if the tumour be diagnosed in time suprapubic lithotomy would be the correct procedure.

I fear tumours associated with stone are generally diagnosed when the litholapaxy operation is well in the way, and in such cases there is a temptation to complete the evacuation of the stone and leave the tumour to be dealt with subsequently; this, however, is a mistake. Litholapaxy in such cases should be abandoned, and the suprapubic operation substituted.

It will thus be seen that I advocate suprapubic lithotomy for two classes of case, *viz.*, stone associated with tumour of the bladder and stone associated with a projecting middle lobe of the prostate, which should be removed at the same time as the stone.

In all other complicated cases unsuitable for litholapaxy I advocate removing the stone through a small opening in the perineum, using the giant lithotrite to crush up large sized stones,

which should have the effect of reducing the mortality to a low figure in this class of case.

I object to the suprapubic operation because of its danger to life. It is followed by great discomfort to the patient by the urine welling up, saturating dressings and irritating the skin. It fails to completely drain the bladder and afford the organ physiological rest. A wound is made in the bladder in its contractile part; this must be followed by a band of cicatricial tissue which must to some extent interfere with the complete contraction and efficiency of the organ during urination. The operation is liable to be followed by a permanent fistula, than which a graver complication could hardly be imagined. Lastly after healing there is a danger that the bladder may remain adherent to the tissues of the abdominal wall in a common cicatrix, a condition which would render the organ functionally a very troublesome one.

None of these objections apply to perineal lithotomy, except and to a smaller extent than in the high method, the danger of a urinary fistula remaining; and where this does occur, the situation renders it less irksome and inconvenient to the patient.

I now append in tabular form a list of my last 66 operations for stone which have not been hitherto published.

Notes are appended to those cases which are of interest: where no notes are given the case was a straightforward one without incident. The statement gives the most important particulars of the cases, age, composition and weight of stone, time taken, &c.

STONE IN THE BLADDER.

Serial No	Name	Caste and Sex	Age	Date operation	Name operation	Time in minutes	STONE		Result	Date Discharge	REMARKS
							Composition	Weight grains			
1	B	M. M.	60	11 9 97	Litholapaxy.	35	Oxalates	420	Cured	18 9 97	Patient had fever on admission, had priapic phymosis, bladder irritable; would retain no fluid, also sacculated, and stone was partially encysted.
2	S	H. M.	70	11 9 97	Ditto	17	Urates	500	Do.	16 9 97	Patient had cystitis, and a daily evening temperature of 100° F. † albumen in urine.
3	W. D.	M. M.	35	11 9 97	Ditto	17	Ditto	55	Do.	16 9 97	A stone was crushed in this man's bladder in Sindhi ten months ago. Urine contains † albumen.
4	A. D	M. M. child	2	13 9 97	Lateral Lithotomy	"	Ditto	35	Do.	25 9 97	A very small ill-developed child. The smallest lithotrite (No. 5) could not be passed; lithotomy was a necessity.
5	G. S.	M. M. child.	10	13 9 97	Litholapaxy.	17	Oxalates and Urates.	80	Do.	16 9 97	Stone excessively hard.
6	S.	M. M.	70	13 9 97	Ditto	23	Ditto	840	Do.	16 9 97	A very large prostate, but urethra capacious; nucleus very hard; tumour large considerable.
7	L.	H. M. child.	3	14 9 97	Ditto	25	Urates and phosphates.	107	Do.	19 9 97	No. 8 lithotrite passed easily.
8	G. R.	M. M.	62	15 3 98	Ditto	"	Urates	110	Do.	23 3 97	
9	P.	M. F. child.	4	16 4 98	Ditto	20	Ditto	13	Do.	22 4 98	

STONE IN THE BLADDER—(continued.)

Serial No.	Name.	Caste and Sex.	Age.	Date : operation.	Name : operation.	Time in minutes.	STONE		Result.	Date : Discharge.	REMARKS.
							Composition.	Weight grains.			
10	L.	M. F. child.	5	18-4-98	Litholapaxy.	14	Urates ...	53	Cured	22-4-98	In this case two unsuccessful attempts were made in a Lady Dufferin Hospital to crush this stone, but both attempts failed to catch the stone. The case was uncomplicated; the child was quite well and running about the ward two days after operation.
11	R.	H. [F.	45	23-4-98	Ditto	12	Ditto	97	Do.	28-4-98	Duration of symptoms five years, cystitis present, urine turbid and flaky, suffering extreme.
12	M.	M. F.	45	27-4-98	Ditto	5	Ditto	46	Do.	2-5-98	
13	M.	M. M.	56	4-5-98	Ditto	33	Ditto	678	Do.	8-5-98	Large stone bladder sacculated, prostate enlarged, urine albuminous.
14	R.	M. M.	40	4-5-98	Ditto	8	Ditto	27	Do.	6-5-98	Large prostate, narrow urethra. No. 12 lithotrite and 14 canula only could be passed, but fortunately the stone was small.
15	S. M.	M. M. child.	3	16-5-98	Ditto	13	Ditto	28	Do.	22-5-98	A stone weighing seven grains was crushed and removed from this child's bladder on the 6th December 1897, five months ago.
16	Y.	M. M. child.	8	17-5-98	Ditto	60	Urates and oxalates.	162	Do.	19-5-98	In this case although a No. 10 lithotrite was used, great difficulty was experienced in catching the stone and its fragments. I then found that the rectum was full of faeces, although I was told the morning enema had acted; the rectum was cleared out by an enema, after which the remainder of the stone was easily removed.
17	A. Y.	M. M.	30	18-5-98	Ditto	8	Urates and phosphates.	207	Do.	27-5-98	Cystitis, urine ammoniacal.
18	I.	M. F.	25	19-5-98	Ditto	19	Urates ...	339	Do.	23-5-98	Irritable bladder.
19	P.	H. M.	35	2-12-98	Ditto	15	Ditto	84	Do.	5-12-98	Prostate enlarged, urethra pouched in front of prostate, bladder sacculated. The urine had to be drawn off in the evening of operation; subsequently he passed it naturally.
20	C. R.	M. M. child.	4	6-1-99	Ditto	?	...	?	Died	6-1-99	A weakly boy with a large stone died on the table from the effects of chloroform, of which he had only inhaled 30 minutes through a Junker's inhaler. Crushing had just begun, when irregular breathing started; artificial respiration was begun before natural respiration had quite ceased; but this and all other means of resuscitation failed.
21	C. L.	H. M.	49	18-1-99	Ditto	8½	Urates	44	Cured	20-1-99	.....
22	Q.	H. M. child.	4	30-1-99	Ditto	8	Ditto	22	Do.	5-2-99	Urine albuminous.
23	G.	Low caste M. child.	4	13-2-99	Ditto	10	Soft urates	5	Do.	15-2-99	.....
24	B.	H. F. child.	4	25-2-99	Ditto	14	Ditto	42	Do.	27-2-99	This patient had no pain even in micturition after the operation.
25	C. R.	H. M. child.	4	20-3-99	Ditto	15	Urates ...	20	Do.	22-3-99	
26	I.	M. M.	30	20-3-99	Evacuated entire.	?	Ditto	5	Do.	22-3-99	This patient had an attack of renal colic, on 12th and 13th. The small calculus remained in the bladder for some days causing pain and interrupting the flow of urine; a No. 18 canula was passed, the evacuator applied, and the stone thus removed.
27	K.	Low caste M.	25	21-3-99	Litholapaxy.	27	Ditto	362	Do.	24-3-99	This patient was extremely weak on admission, and had to be fed up and put on preliminary treatment for nine days.
28	C.	H. M.	30	31-3-99	Ditto	24	Oxylates, urates & cystine.	380	Do.	5-4-99	Urine albuminous, bladder pouched.

STONE IN THE BLADDER—(continued.)

Serial No.	Name.	Caste and Sex.	Age.	Date: operation.	Name: operation.	Time in minutes.	STONE.		Result.	Date: Discharge.	REMARKS.
							Composition.	Weight: grains.			
29	P.	H. M.	37	3-4-99	Litholapaxy.	10	Urates	55	Cured	7-4-99	.....
30	M. S.	H. M.	40	5-4-99	Ditto	15	Ditto	230	Do.	8-4-99	This patient got a rigor after operation, the temperature rising to 103°.
31	N.	Low caste M.	50	8-4-99	Ditto	42	Hard urates	765	Do.	17-4-99	Patient weak, had stricture in membranous urethra, which had to be dilated, prostate enlarged. For two days after operation, this patient passed a few crushed particles.
32	K.	H. M. child.	2½	14-4-99	Ditto	27	Cystine & oxalates.	13	Do.	18-4-99	A stone was removed from the child's bladder previously by litholapaxy on the 6th September 1898.
33	M.	Low caste M. child.	8	16-5-99	Ditto	10	Phosphates	30	Do.	18-5-99	.....
34	A. A.	M. M. child.	8	8-6-99	Ditto	4	Oxalates	10	Do.	10-6-99	.....
35	G.	M. M.	45	15-6-99	Ditto	30	Urates ..	465	Do.	19-6-99	Durations of symptoms six years, urine albuminous.
36	L.	H. F. child.	4	15-6-99	Ditto	33	Urates and phosphates.	130	Do.	17-6-99	Cystitis. Pus in urine.
37	B.	Low caste M. child.	3	26-9-99	Lithotomy lateral.	?	Urates	126	Do.	11-7-99	No. 5 was the largest size of lithotrite that could be passed, and the grip of this was not long enough to catch the stone. Cutting was a necessity.
38	T.	Low caste M.	22	3-10-99	Litholapaxy.	11	Oxalates	152	Do.	5-10-99	This patient had a stricture which had to be first dilated.
39	B.	H. M.	35	11-10-99	Ditto	25	Ditto	65	Do.	13-10-99	A very timid patient; he had a rigid stricture which allowed only No. 6 lithotrite to pass. Fortunately the stone was small.
40	F. B.	M. M. child.	4½	25-10-99	Ditto	22	Oxalates very hard.	50	Do.	7-11-99	This patient got severe malarial fever for ten days after operation.
41	A. W.	Ditto.	4	25-10-99	Ditto	57	Cystine and oxalates.	330	Do.	7-11-99	A contraction of the membranous urethra had to be dilated to admit No. 6 lithotrite; the operation was difficult and tedious, and the patient weak. He subsequently got fever; the urine had to be drawn off for a few days. There was still a little pain on micturition when he left hospital.
42	F.	H. M. child.	6	6-11-99	Ditto	28	Oxalates	120	Do.	9-11-99	.....
43	G.	Low caste F. child.	2½	11-11-99	Ditto	9	Urates and oxalates.	30	Do.	14-11-99	A very irritable bladder. The child suffered great agony before operation.
44	S.	Low caste M.	25	16-11-99	Ditto	6	Ditto	7	Do.	18-11-99	
45	I.	M. M. child.	7	18-11-99	Ditto	28	Phosphates	150	Do.	24-11-99	This patient had been twice cut; lateral lithotomy previously in a Native State. A small fistula followed the last operation through which some urine escaped. The urethra had to be dilated to admit No. 6 lithotrite.
46	M.	Low caste M. child.	2	28-11-99	Ditto	8	Urates ..	7	Do.	2-12-99	This patient had all the symptoms of stone, but an ordinary sound failed to detect it. The evacuator and canula revealed it at once.
47	M. A.	M. M.	82	10-2-00	Ditto	15	Ditto	470	Do.	15-2-00	.....
48	K.	H. M. child.	11	14-2-00	Ditto	43	Oxalates	170	Do.	19-2-00	A weakly patient, took chloroform badly; stone very hard.
49	B.	H. M.	60	14-2-00	Ditto	18	Soft urates	272	Do.	19-2-00	Had cystitis and enlarged prostate.
50	M. L.	H. M. child.	5	28-2-00	Ditto	15	Phosphates	64	Do.	7-3-00	Pain in micturition continued for several days after operation.
51	N.	M. M.	30	4-3-00	Ditto	12	Urates ...	116	Do.	10-3-00	The operation was followed by fever. No urinary symptoms.
52	H.	H. M. child.	2	7-3-00	Ditto	10	Oxalates	6	Do.	9-3-00	.....
53	H.	M. M.	26	23-3-00	Ditto	20	Cystine oxalates Urates.	522	Do.	25-3-00	Stone very hard.

STONE IN THE BLADDER—(continued.)

Serial No.	Name.	Caste and sex.	Age.	Date: operation.	Name: operation.	Time in minutes.	STONE.		Results.	Date: Discharge.	REMARKS.
							Composition.	Weight grains.			
54	S. S.	H. M.	15	24-3-00	Litholapaxy.	85	Urates and oxalates.	144	Died.	3-4-00	In this case there were two stones; one the larger, encysted in the anterior wall of the bladder. There was also a flat tumour in the base of the bladder about the size of an egg, which was discovered by examination after the operation was begun. The encysted stone was crushed and removed with much difficulty. Fever and diarrhœa followed the operation, and micturition was painful. Five days after operation abdominal symptoms set in, which appeared to be connected with the bladder; at the same time a painful swelling appeared in the perineum. The patient was in a very low state, and was removed to his home by his people on 31st March 1900. He died three days afterwards. Cause of death probably inflammatory action in a sarcomatous tumour of the bladder. Had the nature of this case been diagnosed, it should have been subjected to suprapubic operation.
55	P.	H. M.	38	26-3-00	Ditto	5	Urates	126	Cured	29-3-00	.....
56	M.	H. M.	50	26-3-00	Ditto	4	Ditto	55	Do.	30-3-00	.....
57	S. R.	H. M. child.	2½	28-3-00	Ditto	5	Ditto	10	Do.	2-4-00	.....
58	C.	H. M. child.	8	13-4-00	Ditto	12	Oxalates, urates and phosphates.	90	Do.	16-4-00	.....
59	M.	H. M. child.	3	23-4-00	Ditto	5	Urates	7	Do.	1-5-00	A weakly ill-nourished child with a large spleen and dilated stomach; pain in micturition continued. He was again sounded, but no particles remained in the bladder.
60	S.	M. M. child.	12	25-4-00	Lithotomy lateral.	?	Phosphates	65	Do.	18-5-00	This boy had three fistulae in the perineum through which all the urine passed, the urethra being occluded. The bladder was opened, and a director passed through one of the fistulae; the stone was detected and removed; the urethra was then slit up. When he left hospital a small portion of urine was still passing through the perineal wound.
61	W.	M. M.	42	27-4-00	Litholapaxy.	17	Urates and phosphates.	115	Do.	10-5-00	A roughened condition of the surface of the bladder as if this had a phosphatic coating. It was thought to be complete. On the 28th, 29th, and 30th, the patient passed particles of crushed stone, cystitis got worse, temperature rose, and the urine drawn off contained some blood and a few particles of crushed stone. On May 1st he was chloroformed; a lithotrite introduced caught a few particles which were crushed and removed; these weighed 13 grains. After this the symptoms disappeared, and the patient made a complete recovery.
62	H.	M. M. child.	12	27-4-00	Ditto	12	Oxalates	305	Do.	4-5-00	.....

STONE IN THE BLADDER--(concluded.)

Serial No.	Name.	Caste and Sex.	Age.	Date : operation.	Name : operation.	Time in minutes.	STONE.		Result.	Date : Discharge.	REMARKS.
							Composition.	Weight : grains.			
63	R.	H. M.	25	28-4-00	Litholapaxy.	18	Urates and oxalates.	305	Cured	4-5-00	The symptoms had lasted for 15 years, patient emaciated, urine albuminous, bladder very irritable.
64	R.	H. M. child.	10	16-5-00	Ditto.	33	Oxalates &	156	Do.	19-5-00	.....
65	B.	M. F. child.	5	4-6-00	Ditto.	8	phosphates. Urates and phosphates.	66	Do.	9-6-00	.....
66	S.	M. M. child.	3	25-6-00	Perineal Lithotrity.	25	Urates.	75	Do.		In this case No 5 lithotrite was passed, but the stone was too large to be gripped by this ; No. 6 could not be passed. A small incision was now made into the bladder on a staff in the perineal region. B. lithotrite was introduced through this, and the stone crushed. The fragments were removed through a No. 20 canula which fitted the wound so accurately that no fluid escaped during evacuation. The patient is still in hospital under treatment but is doing well, 28th June 1900. The perineal wound which is small and has been subjected to no bruising will heal in a very few days. This operation possesses great advantages. Had this stone been removed whole a very much larger wound would have had to be made and the delicate structures about the neck of the bladder would have been subjected to considerable bruising.

The above 66 cases of stone in the bladder are fairly typical of what we meet with in India. Considered from all points of view they are not particularly favourable cases for operation. In many instances the disease is long neglected and unfavourable complications have set in before the patient reaches the surgeon. The patients are often badly nourished and fall easy victims to malarial fevers. They are frequently in a miserable physical condition.

I have appended explanatory remarks after interesting or complicated cases ; those without remarks are plain uneventful ones.

No selection of cases was made, and no patient was refused operation, no matter in how feeble a state.

It will be observed that of the 66 cases 61 were subjected to litholapaxy, in one the calculus was washed out entire, in one perineal lithotrity was done, and in three lateral lithotomy.

In one case (No. 54) owing to faulty diagnosis the wrong operation was performed ; supra-pubic operation would have suited this case better.

There were two deaths : one from chloroform on the table, the other from complications ten days after litholapaxy.

Of the 66—29 were male adults.
28 male children.
3 female adults.
6 female children.

All cases twelve years of age and under are classified as children ; all over 12 as adults.

The weights given for fragments are those after thorough drying.

It will be observed that the average stay in hospital is very short, and that some cases left hospital before they had completely recovered. This is a common experience in our Indian hospitals. It is impossible to keep many cases sufficiently long.

One question not hitherto touched in this paper deserves some notice, *viz.*, the liability to recurrence after operation, and especially after litholapaxy. Stone frequently recurs, we all know ; and if particles were left behind in the bladder after an unperfect or incomplete crushing operation, concretion (phosphatic) on these particles would quickly take place. The symptoms in such cases would, however, be prominent and severe, and would generally call for further relief before the patient passed out of the surgeon's hands (*vide* my case No. 61). I have not sufficient data at hand bearing on the relative frequency of recurrence after litholapaxy and lithotomy, but my impression is that it is as frequent after the one operation as the other. It might reasonably be expected to be more frequent after a cutting operation, as a rough cicatrix in any portion of the bladder wall should have some effect in favouring concretion, and also in favouring the retention of particles

of gravel or small calculi which reach the bladder from the kidneys.

It must be remembered that the occurrence of a stone either in the bladder or kidney is evidence of a diathesis, which is not removed by the removal of the stone. Recurrence should always be expected in such cases and treatment adopted to prevent it.

THE OPERATIVE TREATMENT OF VESICAL CALCULUS IN KASHMIR BASED ON 116 CONSECUTIVE CASES.

By ERNEST F. NEVE, M.D., F.R.C.S.E.,

Surgeon to the Kashmir Mission Hospital.

Etiology.—In districts where stone is very common, it seems probable that local conditions of food, or more probably water, play an important part in the production of the disease. In Kashmir, stone appears to be essentially the result of disordered chemistry. No doubt we must go back further even than the kidneys and look for the causes in imperfect digestion and incomplete oxidation in the blood and tissues.

Race.—Hindus appear less liable than Mahomedans to suffer from stone, for although they form ten per cent. of the population, only six per cent. are affected by the disease.

District.—Fifty per cent. of the patients were from the Valley of Kashmir. The remainder were from the mountain districts to the south and east—Poonch, Rajaori and Kishtiwari.

Varieties.—About 70 per cent. of the calculi were uric acid, 20 per cent. phosphatic, and 10 per cent. oxalate.

Weight.—The average weight of all stones of which we have a record was 426 grains. Previous to 1891 it was 1,020 grains. Two of the calculi removed by lithotomy weighed respectively eight and seven ounces and two weighed over four and-a-half ounces. The average weight of stones treated by lithotomy was 720 grains. The largest stone treated by litholapaxy weighed 1760 grains.

METHODS OF OPERATION.

1. *Litholapaxy.*—Nothing can be more satisfactory than litholapaxy in children and healthy adults. In quite small stones it is really only a minor operation, which takes a few minutes to perform. Where, however, the stone is large and the patient old, the risks become increased, and there is a class of cases in which, the greater the experience of the surgeon, the greater will sometimes be his doubt as to whether lithotripsy or lithotomy should be performed.

It is on this border-land that all our deaths after litholapaxy have occurred. It does not

at all follow that they would have been avoided by lithotomy.

Case I.—R. D., male, *et.* sixty, looking worn and ill, was operated upon by litholapaxy, 22nd March 1892. The stone measured $1\frac{1}{2}$ by 1 in. The bladder was sacculated. Crushing took one hour, with two introductions of the lithotrite and two of the evacuator. The stone weighed 380 grains. Subsequently the patient was troubled with digestive complications. Constipation alternated with diarrhoea and vomiting. His tongue became very dry. He died on the 31st (ten days after operation). During the last twenty-four hours there was suppression of urine.

In cases of advanced renal disease the danger is also great.

Case II.—M. R., male, *et.* forty. Lateral lithotomy had been performed some years previously. Another stone having formed, litholapaxy was performed on 5th December 1890. The stone was soft and phosphatic, but not large. The instrument constantly became clogged. The operation lasted three-quarters of an hour. No urine was passed that night, so a catheter was introduced into the bladder, and 8 oz. withdrawn. On testing this, it gave a column of four-fifths of albumen. The patient died on the 7th with suppression of urine.

Two stones were crushed through a perineal incision: one of these was the size of a cricket-ball; the other, a smaller stone, weighing 280 grains, was crushed through a boutonnière incision after digital dilatation of the membranous urethra, a method recommended by Harrison, and adopted in this case owing to the blocking of the urethra by a fragment of stone, so that a lithotrite could not be passed.

Where the perineum is not deep, a small mesial incision enables one to explore the bladder with a finger, and to actually push the stone or its fragments between the blades of the lithotrite. To still further facilitate matters, I had a very large evacuating catheter made, the size of my forefinger, which exactly fits and closes the perineal incision, enabling one to evacuate very large fragments. By this operation the risk of hæmorrhage is very much less than after perineal lithotomy, and the danger, however small, of subsequent impotency is avoided. Unfortunately the operation is somewhat restricted in its range of application. Most suitable cases can be better dealt with by simple litholapaxy. While of the cases unsuited for litholapaxy, many are also unsuited for perineal lithotripsy, on account of the stone being encysted, or the bladder unusually pouched, or its walls coated with stony plates.

2. *Lithotomy.*—Often, however, there can be no hesitation in the choice of lithotomy. Local conditions may compel us to resort to it.

Encysted calculi, large stones, very hard oxalate stones in young children, deposits of calculous material on the walls of the bladder, sacculated bladder, enlarged prostate with decomposed residual urine, cystitis, retention, etc., all these are but too common amongst the

class of patients who come to us with stone. Many of them are old or feeble men with bad digestions, a tendency to diarrhoea and low fever, with dry brown tongues and weak circulations. Many of the stones too are phosphatic. Well of course it may be said that litholapaxy is the less severe operation; that may be so if the stone is not too large. But many of these cases require drainage. Even if they had no stones we should feel that their bladders needed drainage and rest.

If in a given case we have decided that litholapaxy is an unsuitable operation, and that perineal litholapaxy is also contra-indicated, our choice practically lies between lateral lithotomy and the suprapubic operation. The extreme rapidity and brilliance of the former procedure must ever be a strong point in its favour. In our experience, lateral has given better results than suprapubic lithotomy in that class of cases to which I have already referred, of phosphatic stone with decomposing urine in old and feeble patients. This we attribute to the short operation and better drainage.

(A). *Perineal Lithotomy*.—As far as we are concerned, the median operation has been entirely superseded by litholapaxy.

The following two cases of lateral lithotomy are examples of recovery, although at one time death appeared imminent:—

Case III.—G. F., *æt.* sixty-six, a thin, weak old man, with foul urine and incontinence. Lateral lithotomy was performed, and a stone removed weighing 200 grains, and measuring 2 in. in length, pear-shaped, with a stalk at one end. The whole was covered with membranous material, which was very foul. On microscopic examination, this was found to contain leucocytes, crystals of triple phosphate, and innumerable micrococci and bacteria. The prostatic urethra was dilated and rigid, and had contained the thin end of the stone. The patient did not do well at first. For a fortnight he had fever, diarrhoea, a dry tongue, rapid respiration, and bad appetite. Salol was steadily administered. He began to improve on the 15th day, the diarrhoea ceased, and the pulse rate dropped. After this he made a good recovery.

Illustrations might be multiplied, but I will only quote one more in which the patient also had a narrow escape:—

Case IV.—A. N., *æt.* thirty-eight, admitted 11th September 1893. Since childhood, difficulty with urine, and sharp, irregular fragments passed at intervals (evidently parts of a large stone). During the operation, first a large cavity was opened, full of calculous material (phosphatic). But the staff lay anterior, and, on continuing the incision, the main cavity of the bladder was opened, and a large stone, weighing 486 grains, found. This crumbled down under the forceps, and was withdrawn piecemeal; the smaller cavity was also cleared by scraping and forceps, and both were then carefully washed out. A medium-sized Keith's glass drainage tube was inserted. For some days the patient was in a feeble condition. Diarrhoea started. The temperature rose in the evenings to 102° Fahr., usually falling in the morning to 101° or 100° Fahr. He took very little food, and his tongue became dry. Then part of the skin of his scrotum became swollen and sloughed. He was

so thin that it was with the utmost difficulty that bed sores were avoided. Next a carbuncle formed on his back, and, to add to the dangers, he succeeded in breaking his drainage tube. The end of this had to be extracted—not a particularly easy operation. It was now found that a communication had occurred between the wound and the rectum, and some urine began to pass by it. About the twenty-second day the diarrhoea became less. The tongue gradually became moist, and then steady improvement set in, and he began to take his food. Urine ceased to pass by the rectum. He was dismissed, convalescent, on 20th October 1893. One obvious moral of this case is, that glass drainage tubes, never mind how strong they may appear, should not be used.

(B). *Suprapubic Lithotomy*.—Lithotripsy, which became a popular operation after Bigelow's improvements, has apparently lost ground both in Europe and America, and there has been a tendency to substitute for it suprapubic lithotomy. This appears to be due to the fact that (1) the class of cases suitable for litholapaxy in those countries is somewhat limited; (2) it is still further limited by the want of experience and confidence of surgeons in dealing with other than small stones; (3) the tendency to recurrence after litholapaxy is believed to be greater than after lithotomy.

In looking at the statistics of hospitals in Europe and America we find that the suprapubic operation appears to be frequently performed. In the Edinburgh Royal Infirmary, of sixty-three operations for stone, twenty-six were by the suprapubic method.

The results depend very largely from the class of case dealt with. If children are included they are relatively favourable. But it may be doubted as to whether the results of the high operation have really improved much, even in this era of aseptic surgery, and notwithstanding the use of Petersen's method, the transverse incision and Trendelenberg's posture. For Belwas in a work published as far back as 1827 gives a mortality of one in twenty-five in children under ten and of one in four on all ages. The high mortality on all ages is due to the fact that the most unfavourable of all cases are left for the supra-pubic operation. Where children are, as I think they usually ought to be, submitted to litholapaxy, the supra pubic cases consist almost entirely of a residuum, the results of which are very bad.

The following are two examples of this operation:—

Case V.—S., male, *æt.* forty-five. (Five years ago, a calculus weighing 7 oz., was removed by Mr. A. Neve, by perineal lithotomy.) Readmitted 23rd March 1887. His urine was phosphatic and ammoniacal, and there was a large, rough, friable, immovable stone in the bladder. We attempted to crush, but the stone was fixed and the bladder too irritable. So supra-pubic lithotomy was performed with some difficulty, as the whole bladder was lined with calculous material, and the stone adherent. The stone weighed 4½ oz.; one of the fragments measured 4 in. by 3 in. The edges of the bladder

wound were stitched to the muscles and a drainage tube inserted. For two days the patient was in considerable danger, with a rapid, feeble pulse, and then he began slowly to improve, the urine became less offensive, and he left on 18th May 1887, cured.

Case VI.—We had another supra-pubic case in a man of twenty-five, very similar. Stone weighed 4 oz. 5 drs., circumference $7\frac{1}{2}$ by $6\frac{1}{2}$ in. He did well for a month, then fever and diarrhoea set in, reducing him terribly, while the wound remained deep and wide. Nevertheless he gradually improved, the wound closed, and he left cured two months after the operation.

Some patients recover in this way after a struggle for life. But it is often a narrow line which divides recovery from death. Either of these cases might have died without bringing any discredit on the operation.

MORTALITY.

KASHMIR MISSION HOSPITAL (1882-1899).

	No.	Recovery.	Deaths.	Mortality.
Litholapaxy	59	53	6	= 10·16 per cent.
Perineal lithotomy	39	35	4	= 10·25 " "
Supra-pubic lithotomy	18	12	6	= 33·3 " "
Total	116	100	16	= 13·79 " "

This table includes three cases who left hospital and the result is unknown; two of these have been included in the deaths.

Litholapaxy (causes of death).—Renal disease, one; debility, two; diarrhoea, two; peritonitis, one (operation performed by another surgeon in our absence).

Perineal Lithotomy.—Renal disease, one; shock, one; septic peritonitis, one; debility, one (after fifty-three days).

Supra-pubic Lithotomy.—Diarrhoea, two (third week); tetanus, one (twenty-fourth day); debility, one (seventh week); peritonitis, two.

Of nine cases of encysted calculi no less than three died.

The following which I append for the sake of comparison is the record of stone operations performed in the Edinburgh Royal Infirmary from 1891 to 1896:—

	Number.	Recoveries.	Deaths.	Mortality.
Litholapaxy	20	18	2	= 10 percent.
Perineal lithotomy	17	12	5	= 29·41 " "
Supra-pubic lithotomy	26	20	6	= 23·7 " "
Total	63	50	13	= 20·5 " "

The difference in mortality between stone districts and those in which the disease is the outcome of individual dyscrasia (and frequently associated with diseased kidneys and feeble circulation) is striking and tends to become still

more emphasised by the skill of those who like Keegan, Freyer, Forbes-Keith and others have had to deal with an immense number of cases. Kashmir is not a stone country. Calculus is rare and usually associated with a depraved constitution. Patients delay coming to the hospital for treatment. As a result, an unusual proportion of those who present themselves are prematurely or really old and feeble. Consequently our results approximate to those met with in European hospitals, the conditions being in many respects similar.

To sum up, it appears to me that—

(1) Litholapaxy is the best operation for a large number of ordinary cases of stone both in children and adults.

(2) The good reputation of the supra-pubic operation is largely based on cases which would have recovered more quickly after litholapaxy.

(3) The class of cases for which the supra-pubic operation is really necessary is unfavourable and necessarily attended by a high mortality.

(4) In old and feeble patients with septic urine, lateral lithotomy is probably the least dangerous operation.

LITHOLAPAXY AT GAYA PILGRIM HOSPITAL.

By C. E. SUNDER, M.B. (LOND.),

MAJOR, I.M.S.

SINCE January 22nd, 1898, I have operated on 70 cases of stone in the bladder at the Gaya Pilgrim Hospital. The annexed table gives brief details of each case. It will be seen that 68 were males and two females; that five were adults and 65 children under 16—most of them small children for their age. The maximum age was 80, the minimum one and a half years—and the latter was a puny infant that could not even sit up, but its urethra readily admitted Weiss' canula No. 8. The average age of the children was a little under six years.

The operations performed were—

Perineal lithotomy-lateral	...	3	1 died.
median	...	2	
Supra-pubic "	...	3	1 died.
Litholapaxy	...	62	2 "

Regarding lithotomy very little need be said. My practical experience of the operation before at Hoti Mardan, where probably more stones used to be operated for in one year at the little civil hospital than in many a special hospital in England. It was here also that I first used the lithotrite, my patient being a sturdy Pathan who refused to be cut, and would have his stone crushed, though I had no evacuator.

His bladder did the evacuation effectually, and he left the hospital cured within the week.

Of the supra-pubic operation my experience is limited to five cases, of which two died, two healed by first intention, and one left hospital with a granulating wound. The mortality of this operation, and of lithotomy, is too high to tempt anyone to practice them who is provided with the instruments for litholapaxy, except under compulsion, as in one of our cases in which the lithotrite broke in the bladder.

About litholapaxy so much has been authoritatively written, and so much has been made of the operation that one is afraid to call it a fairly easy operation in nine cases out of ten, but probably the man who has crushed his hundreds of stones knows better. The *technique* of our operation at the Pilgrim Hospital is I find essentially the same as that of Mr. Freyer, and we had also independently discovered the value of canula and evacuator in the diagnosis of small stones. Our experience has been chiefly among children—93% of our cases being under 16 years, and the average age under six—and the only point as regards *technique* that I desire to draw attention to is the ease with which a child's urethra can be dilated without injury. In most cases lithotrite No. 8 (Weiss) will pass easily into the urethra of a child two to four years old, but in a large percentage of our cases it was not possible to pass even No. 6. Under such circumstances Lister's sounds were always used to dilate the urethra usually up to No. 8, or until the resistance became quite appreciable. The tapering shape of Lister's sounds gives one early intimation of increasing resistance at the spongy portion of the urethra, where, as Mr. Freyer points out, the difficulty is always greatest. I am not aware that dilatation of the infantile urethra has been practiced before, and there may be theoretical objections to this proceeding just as there were to litholapaxy itself, but I have so far seen no ill-effects and shall persist with it until I learn better. Our mortality with it has been *nil*, the detention in hospital has not been high—about eight days—and it has never been necessary to use the catheter after the operation. In a few cases there has been a little fever, but there has been only one case of recurrence of stone.

One point is worthy of notice in this series of cases, *viz.*, the large proportion of children, 65 out of 70, or 93%. During my experience on the Punjab Frontier, I had only two cases of children, out of about 30 cases operated on during the odd months in which I held civil charge; and I do not know of any statistics that show as high a percentage as do those of Gaya, but my references are limited. Since 1883 there have been 439 cases of stone at Gaya, 331 of which were children, or 75.4 per cent.*

Since litholapaxy has been practised (1891) there have been 252 cases, out of which 194 were children, or 77 per cent, and in the last two and half years the percentage has been of children 93 per cent. The appreciation of litholapaxy may have something to do with this, but what I wish to point out is that, if the Indian statistics of stone in the bladder since litholapaxy began to be practiced on children show as large a percentage as the above of infant sufferers, it will become increasingly probable that the majority of cases of stone in adults have their origin in childhood; and if this be admitted, we shall be nearer to a knowledge of the cause, or causes of stone in the bladder than we have been brought to by vague theories regarding Indian diets, unjustified by any published experimental evidence.

If the uric acid of mammalian urine were a "vestigial trace," it might be expected to be in excess in childhood. This indeed is true of the newly-born child, but the researches of Carriere and Moufit (*Presse Medicale*, 21st July, 1897) have definitely established that while the urea and the total solids per kilogramme of body weight are greater in children than in adults, uric acid is both absolutely and relatively less. Thus we are robbed of one explanation of the greater liability of children to stone, for it is around the origin of the urates that the question of ætiology centres. The experimental evidence is small, but it tends to show that a vegetarian diet decreases rather than increases the excretion of uric acid, which is not to be wondered at as about 30 per cent. of the vegetable proteids are passed out in the fæces and the remainder is less digestible than animal proteid. Children in this country are, if anything, suckled longer than is usual in Europe, and they, therefore, come later under the influence of diet. But the very question of the origin of uric acid is undecided, and when physiologists have made up their minds as to its whence, where and how, it will remain to be explained why the urates are deposited in the urinary tract. The hyper-alkaline blood essential to the excessive excretion of urates will certainly not yield the hyperacid urine which is necessary for their decomposition and the deposition of uric acid. Until a satisfactory explanation is offered, it is enough to have a well-founded working hypothesis; as for example, that the deposition of solids from the urine varies with its concentration, which we all know depends upon the dryness and temperature of climate and season. It is at any rate significant that in India stone is most prevalent in dry hot regions. The question is complex, the known facts are inadequate, and most of us in India are not in a position to obtain satisfactory experimental results in a research which would be far more important and interesting than the simple matter of crushing stones in the bladder.

* v. below p. 335.—ED., J.M.G.

LITHOLAPAXY AT GAYA PILGRIM HOSPITAL.

Serial No.	Names.	Age.	No. of days remained in hospital.	Operation.	Nature of stone.	Weight of stone.	Remarks.
1	Dharamdeo ... H.	5	19	Litholapaxy	Stone composed of phosphate.	110 grs.	Cured.
2	Jodhi Singh ... "	9	17	Lateral lithotomy	Ditto ditto ...	457 "	Do.
3	Gopal Bhuiyan ... "	25	7	Litholapaxy	Urate and phosphate	200 "	Do.
4	Deonath Gowala ... "	4	19	Ditto	Phosphate	25 "	Do.
5	Jodhi Ganderi ... "	6	7	Ditto	Ditto	65 "	Do.
6	Ramdhanla ... "	6	14	Ditto	Ditto	50 "	Do.
7	Balgobind ... "	3	22	Ditto	Ditto	164 "	Do.
8	Sukri ... H. P.	5	6	Ditto	Urate and phosphate	90 "	Do.
9	Sibcharan ... H. M.	9	8	Ditto	Ditto ditto ...	66 "	Do.
10	Prayag Singh ... "	50	5	Ditto	Phosphate	50 "	Do.
11	Janki ... "	5	7	Ditto	Calculus phosphate	15 "	Do.
12	Ramlagan ... "	14	7	Ditto	Ditto ditto ..	28 "	Do.
13	Kalia Gowala ... "	5	14	Ditto	Urate and phosphate	190 "	Do.
14	Jitwa Barhi ... "	6	24	Ditto	Phosphate	300 "	Cured. Left the hospital relieved of the stone but some cystitis remained.
15	Prayag Dusadh ... "	6	15	Ditto	Urate and phosphate	270 "	Relieved. The father took away the child from hospital without notice.
16	Budhwa Barhi ... "	10	7	Ditto	Ditto ditto ...	730 "	Died. Operation 1 hr. 30 m. Lithotrite used up to 14—Canula up to 14. Symptoms 2½ years, died on 20th.
17	Chamari Mian ... M.	12	30	Median lithotomy	Ditto ditto ...	360 "	Cured. Median lithotomy was made after an unsuccessful attempt of litholapaxy.
18	Hari Gowala ... H.	3	6	Litholapaxy	Ditto ditto ...	25 "	Cured.
19	Sheo Prasad Singh ... "	11	34	Lateral lithotomy	Ditto ditto ...	1 oz. 120 grs.	Do.
20	Padarath ... "	10	4	Litholapaxy	Ditto ditto ...	125 grs.	Do.
21	Dharamdeo ... "	6	9	Ditto	Phosphate	60 "	Cured. Operation was made on this child once in January 1898 when 110 grs. of debris washed out.
22	Bhatoowa ... "	11	6	Ditto	Ditto	105 "	Cured.
23	Gangwa ... "	3	2	Lateral lithotomy	Ditto	160 "	Died of peritonitis.
24	Purna Gowala ... "	3	9	Litholapaxy	Ditto	320 "	Cured.
25	Kalia Gowala ... "	5	14	Ditto	Calculus phosphate	210 "	Do.
26	Mahadeo Hajam ... "	11	12	Ditto	Ditto ditto ...	80 "	Do.
27	Rachya Singh ... "	6	8	Ditto	Ditto ditto ...	20 "	Do.
28	Bhogloo ... "	5	1	Ditto	Phosphate	62 "	Do.
29	Kokil Barui ... "	4	18	Ditto	Ditto	162 "	Do.
30	Budhwa Kahar ... "	13	19	Suprapubic lithotomy	Ditto	2 oz. 30 grs.	Died of peritonitis.
31	Udit Brahmin ... "	23	3	Litholapaxy	Ditto	12 grs.	Cured.
32	Ganouria Kahar ... "	10	27	Supra-pubic lithotomy	Urate and phosphate	60 "	Do.
33	Chatru ... "	4	19	Ditto ditto	Ditto ditto ...	125 "	Relieved. The guardian took away the boy without notice with a granulating sinus.
34	Abdul ... M.	13	12	Litholapaxy	Phosphate	420 "	Cured.
35	Sukdeo Kahar ... H.	2	6	Ditto	Ditto	24 "	Do.
36	Chamman Kurmi ... "	23	10	Ditto	Urate and phosphate	1 oz. 40 grs.	Do.
37	Akkal Kumhar ... "	25	9	Ditto	Calculus phosphate and urate.	2 oz. 2 dr.	Do.
38	Chedi Pasi ... "	3	5	Ditto	Ditto ditto ...	15 grs.	Do.
39	Petamber Nonin ... "	6	25	Ditto	Ditto ditto ...	96 "	Do.
40	Khijoo Kumhar ... "	4	12	Ditto	Ditto ditto ...	44 "	Do.
41	Surjoo ... "	5	8	Ditto	Ditto ditto ...	5 "	Do.
42	Dusan ... "	2	7	Ditto	Ditto ditto ...	33 "	Do.
43	Jaipal Koeri ... "	16	6	Ditto	Ditto ditto ...	305 "	Do.
44	Jaldharia ... "	7	5	Ditto	Ditto ditto ...	33 "	Do.
45	Durbijwa ... "	8	8	Ditto	Ditto ditto ...	8 "	Do.
46	Kamtoo ... "	3	5	Ditto	Ditto ditto ...	65 "	Do.
47	Thakur Singh ... "	13	2	Ditto	Ditto ditto ...	120 "	Died. Had two stones in the bladder both lying in a pouch at its upper extremity—Lithotrite 8 & 12, Canula 10 & 12. Died, 24th.
48	Sheikh Bipat ... M.	4	5	Ditto	Ditto ditto ...	50 "	Cured.
49	Mahabir Gosaen ... H.	4	4	Ditto	Ditto ditto ...	150 "	Do.
50	Tunnoo Lal ... "	3	6	Ditto	Ditto ditto ...	150 "	Do.

LITHOLAPAXY AT GAYA PILGRIM HOSPITAL—(concluded.)

Serial No	Names.	Age	No. of days remained in hospital.	Operation.	Nature of stone.	Weight of stone.	Remarks
51	Bhichook Gowala. . H.	23	22	Lithotomy (median) .	Calculus phosphate and urate.	690 grs.	Cured. Lithotomy was resorted to only after an unsuccessful attempt at litholapaxy. Lithotrite caught in a pouch at the membranous urethra.
52	Tulsi Kurmi . . . "	6	4	Litholapaxy	Ditto ditto	90 "	Cured.
53	Sukh Lal . . . "	12	3	Ditto	Ditto ditto	195 "	Do.
54	Hirdai Narayen . . . "	2½	9	Ditto	Ditto ditto	60 "	Do.
55	Baldeo Kahar . . . "	2½	4	Ditto	Ditto ditto	8 "	Do.
56	Dukhia . . . "	2	2	Ditto	Ditto ditto	16 "	Do.
57	Sahadat . . M.	3	5	Ditto	Ditto ditto	20 "	Do.
58	Bisambhar . . H.	4	5	Ditto	Ditto ditto	112 "	Do.
59	Ramkhelawan . . . "	3	3	Ditto	Ditto ditto	20 "	Do.
60	Budhoo Gowala . . . "	5	3	Ditto	Ditto ditto	25 "	Do.
61	Sukhia . . . H. P.	3	3	Ditto	Ditto ditto	64 "	Do.
62	Chaturbhuj Singh H. M.	5	1	Ditto	Ditto ditto	50 "	Do.
63	Chamari Kurmi . . . "	7	4	Ditto	Urate and oxalate	120 "	Do.
64	Chamman Goraet . . . "	5	10	Ditto	Urate and phosphate	50 "	Do.
65	Dhanukdhari . . . "	2½	4	Ditto	Ditto ditto	30 "	Do.
66	Basdeo Gosaen . . . "	6	5	Ditto	Oxalate & phosphate	96 "	Do.
67	Daroga Sonar . . . "	3	1	Ditto	Phosphate	2 "	Cured. The stone was drawn out of the left ureter with the lithotrite and evacuated with No. 8 canula.
68	Hari Gowala . . . "	8	6	Ditto	Ditto	30 "	Cured.
69	Ramtahal Kahar . . . "	80	5	Ditto	Ditto	3 "	Cured. The stone was lodged in a pocket behind the prostate out of which it had to be washed out by directing the current into the pouch.
70	Gurpat Lal . . . "	5	4	Ditto	Urate and phosphate	4 "	Cured.

STONE OPERATIONS IN MOOLTAN.

By D. M. DAVIDSON, M.B., C.M.,

MAJOR, I.M.S.,

Civil Surgeon, Mooltan.

A LARGE number of stone cases are treated at the Civil Hospital, Mooltan. They come from Mooltan itself, Bahawalpur, Muzaffargarh, &c., chiefly from the first three districts or areas. In 1899 they came from the following places:—

Mooltan . . .	85
Bahawalpur . . .	93
Muzaffargarh . . .	21
Jhang . . .	17
Rajputana . . .	2
Sialkote . . .	1
Rawal Pindi . . .	3
Dera Ismail Khan . . .	1

Within the last four years 928 cases have been operated upon, sixteen by lithotomy, three by supra-pubic operation and 909 by litholapaxy.

Two of the cases of supra-pubic operation were in men 60 years of age—one died after removal of a 7 oz. calculus, the other recovered; the stone in this case weighing 8½ oz.

The third case was in a child aged two years; the weight of the stone was not recorded, but the remark was made that the stone could not be caught by the lithotrite.

Of the sixteen lithotomies eleven were cured, three were relieved or discharged otherwise and two died, this gives a mortality of 12·5 per cent.; but cases discharged otherwise are only too often taken away by their friends when considered hopeless by them and may be shown as deaths in most instances, thus raising the death-rate to 31·25 per cent.

Of the 909 litholapaxies, 875 were cured, 11 discharged otherwise, and 23 died; if the deaths alone are counted, the mortality on the total is 2·5 per cent.; if the cases discharged otherwise are also shown as deaths, the mortality is 3·7 per cent.—a very marked difference to that obtained by lithotomy. The following table gives further particulars regarding these 909 cases:—

Ages.	No. operated on.	Deaths.	Mortality percentage.
1—5	198	1	0·5
5—10	69	4	5·8
10—20	47	2	4·3
20—30	105	2	1·9
30—40	119	2	1·8
40 and upwards.	371	12	3·2

Stone is most frequent in children under ten, then in persons over 40; the largest percentage occurs under five years. This is clearly shown by the following figures:—

Ages.	No. of cases.	Percentage on total cases.
1—5	198	21·8
5—10	69	7·5
10—20	47	5·2
20—30	105	11·6
30—40	119	13·1
40 and upwards.	371	40·8

The incidence of stone on ages above 40 has not been shown in decades.

The following statistics are derived from 324 litholapaxies performed by me and of which I have kept notes. They are all included in the above figures except 80, but give the incidence on the decades above 40:—

Ages.	No. of cases.	Percentage of total cases.
1—5	68	21·0
5—10	40	12·3
10—20	16	4·9
20—30	27	8·4
30—40	47	14·5
40—50	37	11·4
50—60	52	16·0
60—70	30	9·3
70—80	7	2·2

The large number of cases occurring under ten is again clearly brought out, *viz.*, 33·3 per cent., also the large percentage under five years—between 30 and 40 there is a considerable number and again between 50 and 60. This bears out the usually accepted opinion as to the ages when stone is most prevalent.

Among the above 324 cases there were five deaths giving a percentage of 1·5; one case was attacked with erysipelas beginning at the penis resulting in his death.

One died from syncope; he was feeling all right and showed no symptoms, but at 4 A.M. on the morning after the operation he got up to drink water and fell down dead; two cases died from suppression of urine and one after supra-pubic operation. In this case the lithotrite got bent and could neither be opened or shut. As it could not be removed by the urethra, a blacksmith was sent for, and the shaft of the lithotrite was filed through at the meatus, a supra-pubic operation being performed for the removal of the rest of the instrument and the stone.

I give in addition the results of 21 lithotomies performed by me which are not in-

cluded in the figures for lithotomy already shown:—

Ages.	Cases operated on.	Deaths.
1—5	6	0
5—10	7	0
10—20	1	1
20—30	3	0
30—40	0	0
40—50	1	1
Total ...	21	2 (9·5 p.c.)

All the statistics given relate to males only. Operations on females are comparatively rare. During the period embraced by the above figures, I have performed only ten litholapaxies on women. No doubt this is partly due to females being less frequently affected by stone and partly to fewer women seeking relief. It would be interesting if statistics could be obtained as to the actual frequency of calculus among women. The disease must be much more frequent than the number of operations on women for stone would indicate as in the majority of cases the calculi are probably voided per urethram. It is surprising what a large calculus can be thus voided. While out in the district recently, I removed a calculus about the size of a pigeon's egg from the urethra of a woman by means of a pair of forceps. The calculus was presenting at the mouth of the urethra, in fact a miniature labour had occurred, and it is probable that in time nature would have relieved the woman. During the removal, the urethra was slightly torn, but the subsequent result was very satisfactory.

I may add that no selection of cases is made, every case that comes is operated on.

Uric acid and its combinations form by far the most frequent, oxalate-calculi follow in order, and pure phosphates were noted in only 14 cases.

It is remarkable how tolerant the bladder is to the presence of even large calculi. It is not unusual for patients to come who have had stone for several years, and yet there is very little catarrh of the bladder. Catarrh is more marked when there is also retention of urine—as in old men with enlarged prostates and with weak expulsive powers. I have not observed that oxalates cause more inconvenience than uric acid calculi. The usual history is for the patient to have undergone prolonged treatment for gonorrhoea before he comes to the hospital. Blood in the urine is not such a frequent symptom as the descriptions in the text-books would lead one to suppose, yet during the operation some bladders, even when subjected to a prolonged operation, hardly show a tinge of blood in the water used for washing out, while others bleed very freely even with the gentlest manipulation.

In many cases the bleeding can be readily attributed to the unhealthy condition of the bladder, but in others no apparent cause is present.

Statistics regarding the recurrence of stone after lithotomy and litholapaxy are required.

I do not refer to the recurrence of phosphatic calculi for which in many cases a local cause is obvious, but to the recurrence of uric acid or other calculi.

Within the last year or so I have kept this point in view, but the number of cases observed is not sufficient to justify the formulation of any statistics. The annexed table gives particulars of the recurrences observed, sixteen of them occurred among 254 cases. When the operations follow one another closely, especially in the case of children, there may be a suspicion that a fragment has been left behind in the former operation. This no doubt is true in some cases, especially in difficult cases and in the hands of inexperienced operators.

had been the outer crust of a calculus was removed. It weighed 5 grs. and was free from deposit. It was markedly convex on one side and concave on the other. The man stated that litholapaxy had been performed on him eight years previously.

As far as I can judge, the prevailing opinion among English surgeons is that lithotomy should be performed in children in preference to litholapaxy. This opinion will certainly change in time. The two operations cannot be compared. It may be asserted without question that at all ages litholapaxy is less dangerous than lithotomy, recovery is more rapid and unfortunate accidents such as fistula, &c., do not occur.

If an instrument can be passed, then litholapaxy should be the operation selected, and the knife only used as a last resource, when the stone is too large to be grasped by the largest instrument that can be passed without violence. Infinite patience is often called for in cases of

Serial No.	Age.	Date of previous operation.	Weight.	Nature of stone.	Date of present operation.	Weight.	Nature of stone.	Remarks.
1	18	One year ago ...	?	?	12th July 1892 ...	120 grs.	Uric Acid ...	All operated on by various operators.
2	60	25th July 1896 ...	10 grs.	?	17th Oct. 1897 ...	40 "	Uric Acid.	
3	4	November, 1898 ...	20 "	?	21st Mar. 1899 ...	30 "	Phosphates.	
4	70	10th June 1897 ...	750 "	Uric Acid.	25th May 1899 ...	1,110 "	Phosphates.	
5	3	14th Dec. 1898 ...	5 "	?	28th Mar. 1899 ...	5 "	Urates.	
6	4	25th Jan. 1899 ...	28 "	?	1st May 1899 ...	15 "	Uric Acid.	
7	3	Jan. 1899, Lithotomy.	?	?	25th Oct. 1899 ...	52 "	Urates.	
8	65	9 years ago ...	?	?	13th Dec. 1899 ...	35 "	Uric Acid.	The nucleus was round and smooth and about the size of a split pea; round it were concentric layers. Nucleus probably a new formation and not remains of a previous operation.
9	60	12 years ago ...	?	?	24th Dec. 1899 ...	607 "	Uric Acid.	
10	55	10 years ago, Lithotomy.	?	?	2nd Jan. 1900 ...	110 "	Uric Acid.	
11	25	2nd Jan. 1900 ...	12 grs.	Oxalate	7th Feb. 1900 ...	50 "	Oxalate ...	
12	60	9 years & 5 years...	?	?	13th Feb. 1900 ...	495 "	Uric Acid.	
13	32	?	?	?	23rd Mar. 1900 ...	185 "	Uric Acid.	
14	48	10 years ago ...	?	?	5th April 1900 ...	710 "	Uric Acid.	
15	30	6 years & 4 years...	?	?	16th April 1900 ...	75 "	Uric Acid.	
16	6	22nd Feb. 1897 ...	120 grs.	Phosphate.	1st May 1900 ...	195 "	Uric Acid.	
17	10	21st Jan. 1898 ...	?	?	23rd April 1900 ...	12 "	Urates.	

In many cases, however, I have no doubt that a new nucleus has passed from the kidney. This has been quite distinct in some where the crushing has left the original nucleus intact. This was very clearly exemplified in serial No. 11 of the table. The nucleus escaped entire and was very dark in colour, rounded and quite smooth on the surface. In other cases it is equally clear that fragments have remained as in a case operated on by me in a man aged 40 years who had been operated on at Bahawalpur some time before. There were multiple stones, and on examination it was quite evident that several large fragments had been left behind as the nuclei were found to consist of irregularly shaped fragments which had been rounded by the deposit of more material.

A fragment may, however, remain a long time in the bladder without receiving any further encrustation as instanced in the case of a man, aged 70 years, who came to hospital for treatment; with the evacuator a small piece of what

children where only the smallest canula can be used, the bore is so small that the stone has to be crushed almost into dust and the suction with the evacuator is so weak that fragments come as it were only one by one.

The 324 cases recorded include 30 litholapaxies performed by me in children three years and under, one child being only one and a quarter years of age. In this case the stone weighed 55 grs. The average weight for the 30 cases is 54 grs., the greatest 350 grs. These cases all recovered satisfactorily.

So impressed is the native with the advantages of litholapaxy that even when necessary it is very difficult to obtain his consent to lithotomy.

The time spent in crushing different stones is very variable—a small stone may take an hour or more, a large stone a few minutes. Some stones break up into nice pieces which are easily evacuated while others break up into flakes. Sometimes more time is spent in the removal of such a flake than that spent in the rest of a large stone.

Bladders, too, differ much in shape, consistence, &c. Some have a pouch to the right in which the stone lurks, others to the left—in still more the pouch is behind the prostate, while in other cases the stones seem glued as it were to the anterior surface of the bladder above the pubes, and can only be seized by depressing the handle of the lithotrite. After the use of a large instrument when a few pieces remain in the bladder just too large to enter the canula, I find it sometimes more satisfactory to employ a small instrument—No. 6, No. 8, or No. 10. These work more freely in the bladder and can pick up fragments which appear to escape the larger instruments.

It is a matter of practice and opinion, but I find Bigelow's handle more satisfactory than Thompson's. The instruments at this hospital are made by Weiss with Bigelow's handle and have short well-bent beaks. This shape of beak is easy to pass, and seizes small pieces more readily than lithotrites with straighter beaks such as I have used at another hospital in this province. It may be that I was not used to the instrument, but I found difficulty in picking up the fragments with this shaped beak.

The evacuator which I think most suitable is Bigelow's without any grating or trap. It has the glass receptacle immediately below the India-rubber bulb to which it is directly fixed by a metal collar; from this collar another piece of metal arises carrying the tube to which the canula is fixed. In this evacuator the canula, when in the bladder and fixed to the evacuator, forms one whole instrument as it were with the evacuator; the exact position of the point of the canula in the bladder is perfectly clear and the command over it is complete. When in use too and full of water, the whole apparatus is properly balanced. In Thompson's evacuator the glass receptacle simply forms a dead weight, and it is difficult to know what one is doing in the bladder—as for balance no attempt is made. No such elaborate apparatus is required nor are traps, &c., necessary. I have never observed any tendency on the part of fragments once they have fallen into the glass receptacle to be washed back into the bladder.

In the instrument in use here the operator has complete control, and can move the evacuator from side to side or up and down and search all the lurking fragments.

Cases arise in which the stone is in the prostate. Each case must be treated on its own merits. The stone may be removed by the urethral forceps or pushed with the greatest care with the lithotrite into the bladder, or the evacuating canula may be inserted into the urethra and passed till it is quite close to the calculus, then fixed to the evacuator, and an attempt made to wash the stone into the bladder. It is needless to remark that no force must be used. As a last resort the knife may be employed.

On the 15th April 1900 I removed an oxalate calculus weighing 150 grs. by litholapaxy from a man aged 28 years. He also had a stone embedded in his prostate which was removed by the urethral forceps. In another case the stone in the prostate fell into the eye of the canula and was thus removed easily.

In urethral calculi the urethral forceps should first be applied, and in the case of failure an incision should be made in the middle line cutting down on to the stone, the wound being sutured preferably with horse-hair sutures and dry collodium dressing applied. In none of the cases thus treated have I seen any subsequent fistula.

A child aged 2½ years was brought for treatment on the 27th January 1900. Three days before retention of urine had suddenly occurred. When the child came to the hospital, there was extravasation of urine in the scrotum. A calculus was found blocking the urethra about 1 inch behind the junction of the penis and scrotum. This was removed by an incision in the middle line, the incision dividing the scrotum into two. Incisions were also made to let out the extravasated urine. The child was discharged cured on the 15th February 1900. The stone weighed 5 grs., was quite round and about the size of a buckshot.

Various difficulties are met with in litholapaxy. Organic stricture of the urethra has to be treated before litholapaxy can be performed, but occasionally cases are met in which there is great difficulty in passing the lithotrite, which under ordinary circumstances enters the bladder without the slightest difficulty. The obstruction gives the impression of being due to a bridle or flap of mucous membrane against which the point of the lithotrite catches. Patience in time finds a way out of the difficulty, but in several cases I have found each introduction of the instruments rendered difficult on this account.

An enlarged prostate rarely gives any trouble in the passage of the necessary instruments—the passage may be tortuous or one-sided, but still the instrument goes into the bladder. Occasionally, however, considerable bleeding takes place.

In operating on small children, after crushing the stone, on the removal of the lithotrite, urine sometimes follows; when there is straining, the urine carries with it débris from the bladder, some of which remains in the urethra and causes difficulty in the passing of the canula. A smaller instrument will have to be used than would have otherwise been necessary and plenty of oil employed.

In other cases while removing the lithotrite, a piece of stone appears to become fixed in the angle inside the bladder between the beak of the lithotrite and the upper part of the urethra. The lithotrite will not come out without the

application of considerable force—in such cases it is advisable to turn the beak of the lithotrite downwards and to remove it in this position.

Pouches in the bladder are not infrequent and sometimes cause considerable trouble—not only in the crushing, but also in the subsequent evacuation of the fragments. In such pouches fragments are apt to fall and to be unaffected by the stream of water passing over the mouth. This happened in a case operated on by me in Delhi. It was thought that all the fragments had been removed. Owing to the retention of urine, a catheter was subsequently passed and several fragments came away with the urine. Strange to say the fragments were not observed till several days after the operation, which took place on the 21st July 1899. The bladder was again washed out after crushing—on the 28th July 1899 when several more fragments were removed—the patient died on the 28th July 1899.

The pouch may be to the right or left of the neck of the bladder or immediately behind the prostate. In the presence of a pouch the beak of the lithotrite must be turned towards the part of the bladder in which it is situated, and during the evacuation if the bladder is moderately distended, the eye of the canula may be made to face the pouch. If, however, a flapping sound is heard the eye of the canula must at once be turned away from the pouch as this sound is due to the mucous membrane of the bladder being brought in contact with the eye of the canula owing to suction, and although I have observed no ill effects from it, still it cannot be advantageous and leads to bleeding. This sound can in no way be compared to the click produced by the contact of a fragment with the evacuator. This click is, however, somewhat simulated when a small Thompson's sound is passed into the bladder and pushed backwards and forwards against the base of the bladder while the opening in the distant end of the sound is not closed.

The bladder may be contracted round the stone leaving very little room for opening the blades of the lithotrite. This may be overcome by gently and slightly distending the bladder with water. No force must be used, or the bladder may be ruptured as in a case related to me by a friend who was unfortunate enough to meet with this accident.

The stone may be so large that the sliding mechanism of the lithotrite cannot be converted into the screwing. It may be possible, however, by chipping away as it were at the side of the stone so to reduce its bulk as to enable it to be crushed properly or its axis may be altered. On one occasion a rather influential Mahomadan came for operation. The stone could not be grasped in spite of repeated efforts. As he was averse to a cutting operation, I advised him to come again in a fortnight when I was able to grasp the stone and crush it.

Some stones are very hard—so hard that it appears impossible to crush them. In several instances the instrument has bent at the junction of the beak and shaft. One such case where the lithotrite became so bent that it could not open or shut has already been mentioned by me. As Freyer has already noted, if the lithotrite is well screwed down on to the stone and kept so for some time, the stone breaks with a loud crack. In April last, I met with such a stone. It had lasted for six years and weighed 1,552 grs. or 3½ oz. The operation entailed severe manual labour and blistered hands. In the same month I operated on two men aged 60, in which the fragments weighed 1,230 and 1,532 grs. respectively, also on a case in which the fragments weighed 2,307 grs. or practically 6 oz. All were successful.

A PLEA FOR THE MORE EXTENSIVE USE OF URETHRAL LITHOLAPAXY, PERI- NEAL LITHOLAPAXY AND PERI- NEAL LITHOTRITY, BASED ON AN ANALYSIS OF 7,951 CASES.

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THE cases analysed in the tables in this article were operated on between 1890 and August 1899. The details of the cases were extracted by my clerk from the records of the leading hospitals of this province and of a few of the leading hospitals of the N.-W. Provinces and Oudh. I have to thank the Civil Surgeons of those districts for so kindly having put the records at my disposal. The matter extracted from those records included a number of cases which did not give all the necessary details, and all such cases have been excluded from my analysis. The matter extracted does not cover the whole period from 1890 till August 1899, as in many of the hospitals the records of but a few recent years were available. The statistics do not include women and female children, as I have excluded such from my analysis. The composite results show the work of no individual operator, but show the work of the average Civil Surgeon in districts in which stone abounds. Table No. I shows the relative incidence of stone in the different periods of life. It also shows the mortality incident to lateral lithotomy and to litholapaxy in the different periods of life. From the statistics it will be seen that the average operator is not a novice in the art either of lithotomy or of litholapaxy. When we compare the 3.30 per cent. death-rate in perineal lithotomy in children twelve years of age and under, with the 1 in 16, or 6.25 per cent. death-rate in children given by

Sir Henry Thompson, as in his time the success in corresponding ages in the hands of the best lithotomists in England who did all their operations by lithotomy, it will be fairly plain that the Indian Surgeon is as dexterous at a lithotomy as he is at a litholapaxy; and though the lithotomy, represented in the tables in children, is as fine a record of work as has ever been published, when compared with litholapaxy in children, it is an incomparably inferior operation. Litholapaxy in children as shown in these tables more than justifies the anticipations of its distinguished originator and establisher—Keegan.

The statistics do not show the high class work of the very experienced operators, nor do they show the work of the operators who were in their novitiate period as operators on stone. They show the average operator's results. I have not shown the results of my own experience separately as such would interfere with the principle of an average. I have here to point out that the statistics of individual operators are not so instructive as those of an average from the point of view of this article. The statistical Table No. I largely speaks for itself, but it is necessary to state that in every hospital from which these records were extracted both litholapaxy and lithotomy were being done on all ages. The smallest male child operated on by litholapaxy was one year old and 12 lbs. weight. Generally speaking, it was cases unfavourable for urethral litholapaxy which were submitted to the other operations, so that the results of cutting were not so favourable as if all the cases had been submitted to the cutting operation. On looking over Table II, and comparing the cases which were successfully dealt with by litholapaxy and the number of smaller stones which were cut for, the inference which in my own personal experience holds good, follows: *i.e.*, that under eighteen years of age cutting has in almost all cases been for stones too hard to crush by an instrument which would pass by the urethra. Above eighteen years other factors operate. Under eighteen years an enlarged prostate or a pouched or sacculated bladder or urethral strictures, the result of venereal disease, do not come under consideration, and hence it is that under eighteen years of age cases of stone are almost always uncomplicated except from conditions of chronic cystitis, and occasionally from kidney disease consequent thereon. From eighteen years of age upwards on looking over the tables we see that perineal lithotomy, when it has not been done from bladder or urethral complications, has been done (except in about thirty-two cases out of two hundred and seventy-six) for stones of five ounces and less, and when we compare this with the number of cases which have been successfully dealt with by litholapaxy (for stones of weights equal and over that of stones which have been

cut for) the same inference holds good, *i.e.*, that a large proportion of the stones cut for were so hard that an instrument which would pass by a normal urethra was powerless to deal with them. In this matter I am speaking from considerable personal experience as well as from the records from which the tables are compiled. The cases in my own personal experience are cut generally on account of the hardness of the stone rather than on account of the size of it.

Before going into the remedies which I propose, to lessen the purely cutting operations, whether perineal or supra-pubic, it is necessary to clear up the terminology, as the terms seem to be mixed up in the minds of many. "Litholapaxy" as the term is ordinarily used implies litholapaxy by the urethral route, and as the perineal route is occasionally adopted, I propose to use the terms "urethral litholapaxy" and "perineal litholapaxy." The urethral litholapaxy is so well described by Keegan in his articles, and by Freyer in his treatise on "*The Modern Treatment of Stone in the Bladder*," that it would be useless repetition for me to go over that same ground.

Perineal litholapaxy, as our readers know, was brought formally before the profession by Brigade-Surgeon Forbes Keith, I.M.S., then Civil Surgeon of Hyderabad, Sindh (*vide Lancet*, 30th September 1893).

Keith was beyond doubt the originator of the operation, and the man who established it as an operation to stay. Any man interested in the modern treatment of stone in the bladder should not be ignorant of Keith's original article above referred to. It forms, and will continue to form, one of the great landmarks in the modern treatment of stone in the bladder. The essential feature of Keith's operation is that he incises the membranous portion of the urethra only and does not incise or wound the prostate nor interfere with its functions. He carefully dilates the prostatic end of the membranous urethra so as to get into the adult bladder by that route, a No. 20 lithotrite, and into the bladder of boys, a relatively smaller one, in the case of stones which could not be dealt with by a lithotrite, which would pass by the urethra, either from hardness or size or both combined. Keith terms his operation a "perineal lithotrity," but from our point of view it is a veritable "litholapaxy," as he uses an evacuator of some form to remove the debris. If he incised the prostate, he could not use an evacuator. An evacuator can only be used when the urethra or prostate grasps the canula. One cannot evacuate without a vacuum. If the prostate be incised, the sphincter muscle cannot grasp the canula, and thus a vacuum cannot be established.

Keith's operation has the advantage over any lithotomy in which we incise the prostate or open the bladder suprapubically; in that he does not interfere with the functions of the

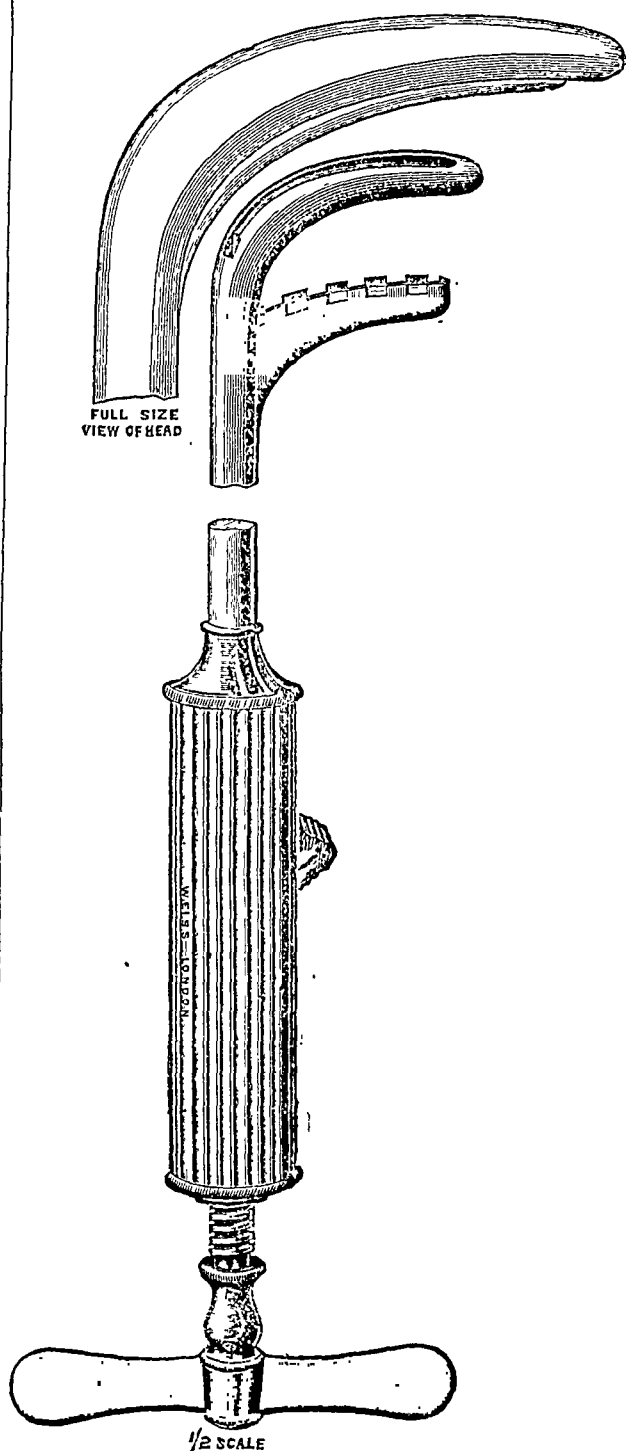
bladder or prostate, and in that the death-rate is below that of any cutting operation in which the bladder is entered by the Surgeon's knife. Major Baker, I.M.S., records in the *Lancet*, June 27th, 1896, 253 cases of Keith's operation with a mortality of 1.97 per cent.* Part of this is Keith's own work. When we consider that the operation was only done in cases which were impossible by the urethral route on account of the size or hardness or both combined of the stones, and compare it with the two other alternatives, lateral lithotomy or suprapubic lithotomy, I think I am fairly justified in saying that Keith's operation is established to stay for all cases that are not beyond the power of a No. 20 lithotrite.

The cases which are beyond the power of a No. 20 lithotrite, I propose to deal with by extending Keith's wound by incising the prostate in the middle line sufficiently to allow the passage of a No. 26 lithotrite, to break the stone into fragments with this instrument and to pick them out with one of the smallest sized lithotomy forceps, thus removing a large stone by the smallest possible wound in the prostate. The only other alternative for such a case being suprapubic or lateral perineal lithotomy, the latter of which would imply a very large wound on the prostate, and in either case a terrible mortality. I thus hope to approximate the mortality of such cases to the mortality following Keith's operation.

I, while Civil Surgeon of Gujrat in this Province, introduced this operation in the cold weather of 1896-97 (*vide* Keegan's article in the *Lancet*, January 30th, 1897, and Keegan's reference in the *Lancet* and *British Medical Journal*, July 1897). The operation was devised by me to deal with stones too large, or too hard, or both, to be dealt with by a lithotrite which would pass by Keith's route. I got the instrument, the plate of the most recent pattern of which appears in this article, named the "giant" lithotrite, made specially for this purpose.

The instrument was intended to put a few fractures in the stone only. If it were found necessary to reduce it further, that could be more readily done with a smaller instrument; but an essential feature of the operation is that the stone should not be reduced to very small fragments, but only into such fragments as a small lithotomy forceps would, when inserted, bring out without bruising the tissues. To take fine *débris* out of a bladder into which a lithotomy wound has been made considering that we cannot use an evacuator is not the simplest matter in the world. This operation I term a *perineal lithotrity*. The same term applies to any combination of perineal cutting and crushing, in which an evacuator is not and cannot be used. M. Dolbeau entered the bladder by Keith's route, but he dilated the

prostatic urethra sufficiently to allow a crushing forceps to pass. Mr. Reginald Harrison does the same; Mr. Milton, of Cairo, does a lateral lithotomy, and uses Harrison's forceps to crush the stone. Harrison's and Milton's forceps are such that the closed instrument is the circum-



ference of the index finger of the operator. When I ordered my "giant" lithotrite, I was just after cutting a few cases for five to six-ounce stones, which were hard almost as granite, having come to the conclusion that no crushing forceps, such as Reginald Harrison's, would deal

* *V.* below, pp. 331 and 327.—*Ed.*, I. M. G.

with them. A crushing forceps of the magnitude of an ordinary cephalotribe would hardly be capable of breaking such hard stones. There was a powerful crushing forceps at the time in the hospital, which would require as large a wound to let it in as could let out the unbroken stone. I tried it on the fresh stone when extracted; it would no more break it than it would break granite, so that I then considered and still do consider all such crushing forceps for "hard stones," as we use the term in India, out of the question. The original instrument was of the fully fenestrated pattern No. 26 at the angle, No. 20 in the stem (English scale). The male blade and screw were not united by a ball and socket joint as in other lithotrites, but were separate pieces for the sake of strength. The female screw was in a steel block on the end of the female blade. The screw had a single thread. This instrument has since been modified by Keegan (vide *Lancet* and *British Medical Journal*, July 1897), into a lithotrite with a ball and socket joint between the screw and male blade, and with a lock-and-forceps catch as in ordinary lithotrites. The original instrument has never failed to do its duty. The modification, though it seemed to me to be a more perfect and a more convenient instrument than the original one, has in a hospital in this province by a highly skilled operator been put on a stone 2,727 grains (or under six ounces), and while the left hand piece was held by a

as it gives power in the left hand over the instrument. The point is No. 16, the angle No. 26, and the stem tapers gradually from the angle to beyond the grip to No. 20 (all English scale). There is no necessity for the stem within the grip being so fine as lithotrites are usually made. They are made fine in the stem to allow freedom of movement in the urethra. But the stem of the female blade within the grip is not hampered by the urethra while in action, as while in action it is in the bladder and not in the urethra. The female blade of the giant lithotrite is fully fenestrated; the male blade has a single median row of cutters after the manner of Keith's lithotome. The former "giant" had a double row of cutters on the male blade as in ordinary lithotrites. This was a mistake; it constituted them "crushers," whereas the single row constitutes it a "cutter," and gives it, as Keith has shown, and as common sense shows, incomparably more power of putting a fracture in a hard stone than is possessed by an instrument with a double row of cutters. Anyone who has any doubt on the matter of the relative efficacy of the "cutter" male blade, if he consults the artisan known as the stone-cutter he will have his doubts dispelled. The screw and the male blade are two separate pieces for the sake of strength, and the female screw is in the end of the left hand block or handle. The screw has but a single thread. The "giant" above-mentioned which was strained had a double



A. B.

strong man, the screw was driven home by another strong man, each exerting his full power. At last the stone gave way. The screw and lock and forceps catch were strained, and the shaft of the female blade was strained in the space which I term the 'grip,' that is, the space marked 'A—B' in the above woodcut. The grip of the female blade is the part of a lithotrite which is usually strained. The Surgeon who operated on the case kindly gave me the stone, which I sent to Brigade-Surgeon Keegan, I.M.S., as a specimen. I tried a powerful crushing forceps on one of the fragments. It would no more break it than it would break the same bulk of steel. The 'giant' lithotrite has the advantage over any crushing forceps in that it is more powerful, and in that it will go into an incomparably smaller wound than any efficient crushing forceps. The instrument of the most recent pattern I am now getting out from Weiss. It is shown in the woodcut. It is when closed fifteen inches long, the blades are eight inches long, the left hand piece or handle is five inches long, and one and a quarter inches in diameter. The large diameter is of importance,

thread screw. If it had had a single thread screw, one man would have had as much power over the instrument as the two had. A double thread screw implies double speed in screwing up, a single thread implies half the speed of the double thread, and consequently double the power over the instrument by the operator. This point is illustrated by the power of a man in lifting a load with a fast and with a slow lifting windlass; the slower the windlass lifts, the heavier the load the man can lift.

As regards the operation, having made a small median or lateral incision in the prostate, the screw of the instrument having been screwed out sufficiently to allow the male blade to slide out, as far as may be necessary, the instrument is inserted, closed and harnessed on the stone, the screw is screwed up, and the fracture finished. The process may be repeated for a couple of fractures, according to the size of the stone. Any further fractures should be made with a smaller instrument, which will be found much more convenient. I here again point out that such stones should not be pulverized, but only broken into such fragments as a small lithotomy forceps

will fetch out without bruising the tissues. With this instrument we are able to get a large stone out by "perineal lithotripsy," as I have above defined the term, by a smaller incision in the prostate than by any other instrument for a similar purpose yet devised. When we must incise the prostate to get out a stone, the smaller the wound, the smaller will be the death-rate. Milton, of Cairo, considers (*Lancet*, April 18th and 25th, and May 2nd, 1896) that any form of perineal lithotripsy is unnecessary if the operator be skilled with the lithotrite, and that since he has by urethral litholapaxy dealt with a stone of over 12 ounces dry weight composed of mixed urates and phosphates "more than usually dense" successfully in a male with a lithotrite No. 15 $\frac{3}{4}$ at the angle, and No. 14 in the stem with a grip of 5 inches, it therefore follows that all smaller stones with his lithotrite by a skilled operator could be dealt with by urethral litholapaxy, and that consequently, Keith's operation is unnecessary. He also says that he performs perineal lithotripsy with a crushing forceps through an incision in the prostate "as a demonstration for his students," though he has never yet (1896) met with a stone uncomplicated except by hardness and size which he could not deal with by urethral litholapaxy with his lithotrite just described. I think I am fairly representing the practice of Indian operators when I say that we, considering the death-rate associated with any operation in which the prostate is incised, do not incise the prostate with such an easy mind. We only do it when we cannot do a litholapaxy.

Milton says the stone of over 12 ounces dry weight, abovementioned, was "more than usually dense." I presume from the term in inverted commas that the stone was the type of what in Egypt is termed a *hard* stone, the "usually dense" stones being softer. This seems to me a fair inference from Mr. Milton's language. I have only to say that in India we could consider what are termed "hard stones" in Egypt as unusually soft. Milton says that they are chiefly caused by the disorders consequent on the presence of the embryos of the Bilharzia. I presume they are deposited in chylous or such urine, so we can understand such stones being unusually soft. One thing is certain, and that is that Milton's instrument above described would be powerless to crush what we in India call a "hard stone" of four ounces. His instrument is no more powerful than a Weiss' A (No. 16), which is about the same size, and which I think most of us in India consider as good as the best lithotrite of its dimensions made. We occasionally find stones of four ounces which it is unfit to break. If Milton's instrument above described were pushed home on what we call a "hard" 4-ounce stone, the operator could find that he would have to do a lithotomy to extract the fragments of the instrument. Weiss' instruments are made with an extent of grip such that they are capable of dealing with the largest stone of average hardness which they are capable of grasping, and the grip of a Weiss' instrument of the weight of Milton's above described is small indeed compared with that of Mr. Milton's. I think it follows that no inference can be

TABLE NO. I.

Showing the analysis of 7,954 cases operated on for stone in the bladder.

URETHRAL LITHOLAPAXY.				PERINEAL LITHOTOMY.				SUPRAPUBIC LITHOTOMY.				PERINEAL LITHOTRITY.			
Ages.	Number of cases.	Number of deaths.	Percentage, death-rate.	Ages.	Number of cases.	Number of deaths.	Percentage, death-rate.	Ages.	Number of cases.	Number of deaths.	Percentage, death-rate.	All ages.	Number of cases.	Number of deaths.	Percentage, death-rate.
Up to six years.	1,802	28	1.55	Up to six years.	389	10	2.57	Up to 12 years.	11	2	18.18	.....	27	2	7.4
From six up to 12 years.	813	17	2.09	From six up to 12 years.	247	11	4.45	From 12 years upwards.	18	10	55.55				
All ages up to 12 years.	2,615	45	1.72	All ages up to 12 years.	636	21	3.30								
From 12 to 18 years.	232	6	2.96	From 12 to 18 years.	68	7	10.29								
From 18 to 55 years.	2,797	96	3.43	From 18 to 55 years.	202	47	23.26								
From 55 to 100 years.	1,274	73	5.73	From 55 to 100 years.	74	30	40.54								
Total ...	6918	220	3.81	.....	980	105	10.71		29	12	41.37		27	2	7.4
Total of all operations in all ages.	7,954	339	4.27	.....	...	...	...	.....	...	...	...	Keith's operation up to 1895.	253	5	1.97

* Vide below p. 331, and *Lancet*, June 27th, 1896.

TABLE II.

Showing the large Stones operated on out of the 7,954 Cases analysed in Table I. Weight in Grains.

LITHOLAPAXY.

AGE, 6 YEARS AND UNDER.				FROM 6 TO 12 YEARS.				FROM 12 TO 18 YEARS.				FROM 18 YEARS UPWARDS.			
SUCCESSFUL.		DEATHS.		SUCCESSFUL.		DEATHS.		SUCCESSFUL.		DEATHS.		SUCCESSFUL.		DEATHS.	
Weight of stone.	No. of cases.	Weight	No. of cases.	Weight.	No. of cases.	Weight.	No. of cases.	Weight.	No. of cases.	Weight.	No. of cases.	Weight.	No. of cases.	Weight.	No. of cases.
240	100	About 240 grains.	9	360	22	240	4	600	16	634	1	1,900	23	1,000	17
300				420		380	4	720		976	1	2,400		1,200	
300				420		960	1	720		1,040	2	2,690		1,200	
360	43			480	7			840	6	3,840	1	3,059	1	1,500	8
360				480				840				3,120	1	1,500	
420	9			540	3			1,000	3			3,360	1	2,000	8
420				540				1,000				4,560*	1	2,000	
480	10	All other deaths under 240 grains.		600	6			1,200	4					2,500	3
480				600				1,200						2,500	
540	4			720	17			1,500	3					3,000	5
600				800				2,117		1					
620	1			900	3			2,160	1						
900	1*			985		1		2,170	1						
940	1			1,100	1										
960	1*														
1,020	1*														

LITHOTOMY (PERINEAL).

240	21	480	2	480	17	360	1	600	5	600	3	1,900	19	1,000	10
300		240	2	480	13	480	3	720		720		2,400		1,200	
300	14	All other deaths were under 240 grains.		720		4	600	1	840	8	930	2	2,580	1	1,200	8
360				720	1		1,000	960	1		2,640	1	1,500		
360	6			960	1	1,000	2	2,880	1	1,700	9				
420				960	1	1,200		2,940	1	2,000					
420	11			1,200	1,080	1	1,500	1	3,560	1	2,000	5			
480				1,218	1	1,620	1	3,660	1	2,500					
480	2	1,660	1		1,80	1	7,000	1	2,500	4					
540					1,950	1			3,000						
600	4													4,800	1
680	2													6,000	1
720	3														
840	2														
980	2														
999	1														
1 313	1														

* Were soft phosphatic stones.

All stones not catalogued in above table were under the above weights.

drawn from the hardness of Egyptian stones as regards the grip of lithotrites for use in India, or as regards the necessity for perineal litholapaxy or perineal lithotripsy.

Compare Milton's stone of over 12 ounces dealt with successfully by a lithotrite No. 14 in the stem and No. 15 $\frac{1}{2}$ at the angle, with the stone abovementioned, 2,727 grains, or under six ounces moist weight, which strained the stem of the female blade in the grip of a lithotrite No. 20 in the stem (English scale). This is a sample of what we call in India a "hard stone." This is the class of stone for which in India the necessity exists both in the child and in the adult for a Keith's operation in the first instance, and if that give not power enough, for a "perineal lithotripsy" in the second instance.

I may here mention that I do not include as suitable cases for the three operations which I advocate, encysted stones or stones in a sacculi. By a sacculi I mean a pouch with a constricted mouth. They will always have to be dealt with by perineal lithotomy or suprapubic lithotomy as circumstances may require. Encysted stones in my experience are rare indeed. In over 300 operations for stone I have only come across one; it was a uric acid stone about the size of a hazel-nut encysted in the prostate. I cut down on it from the perinæum without incising the urethra or opening the bladder. It seems to me that it is the novice in the art who comes across many encysted stones. Stones in a sacculi are also rare; I have never come across one. Stones in a wide-mouthed pouch we occasionally meet with, but they are capable of being dealt with by urethral litholapaxy by any operator skilled in the use of a lithotrite, though they are the most difficult cases we come across for litholapaxy.

The object of this article as before stated is to extend the sphere of urethral litholapaxy as far as possible, and when we reach the limit to adopt Keith's operation, and what is found by Keith's operation impossible, to advocate the adoption of perineal lithotripsy with a large lithotrite; so that we may do away with lateral lithotomy and with suprapubic lithotomy. As will be seen from the number of cases in the statistics, cut for small hard stones, to extend the range of urethral litholapaxy, we require to increase the power of our lithotrites without increasing the size of the blades. This we can do by supplying every lithotrite, large and small, with a spare male blade having a single median row of cutters. Such a cutter male blade will have much more power of putting a fracture in a hard stone than the ordinary male blade now used with its double row of cutters. The latter is a "crusher," the former is a "cutter." When a fracture is put in a hard stone with such a cutter, it can be taken out and the ordinary male blade inserted to finish the operation, as the latter will more readily pick up the fragments. I would also, as

above pointed out, get the female blade "within the grip" made stronger than it now is. From the very heavy death-rate following suprapubic and lateral lithotomy in the adult, I think we are justified in making every endeavour to reduce the purely cutting operations to the minimum possible, and in cases in which we must incise the prostate, we should endeavour to reduce the size of such incision as much as possible. The operations of M. Dolbeau, Harrison, and Milton, as operations of election, when compared with litholapaxy are, in my opinion, operations which only require to be mentioned to be condemned.

The cases of suprapubic lithotomy in the statistical table were all for large stones, and the cases of perineal lithotripsy were also for large stones. They were "perineal lithotripsy," as I have defined the term, with a lithotrite, and were cases in which the other alternative was suprapubic lithotomy.

"Keith's operation," I consider, should take the place of lateral lithotomy in all ordinary cases of large or hard stones, impossible by the urethral route, and "perineal lithotripsy" with a lithotrite should take the place of suprapubic lithotomy in cases beyond the power of a No. 20 lithotrite.

The statistics of "perineal lithotripsy" in this province are few, as only a few hospitals are furnished with the necessary equipment, although the hospitals in this province generally are very well equipped for litholapaxy in children and in adults.

SOME REASONS WHY LITHOTOMY IS STILL LARGELY PERFORMED.

By G. T. BIRDWOOD, M.A., M.D. (CANTAB.),

CAPTAIN, I.M.S.,
Cecil Surgeon, Ghazipur.

THESE considerations in favour of lithotomy are not put forward in any spirit of prejudice to litholapaxy, but rather as an attempt at an explanation why lithotomy is still so largely performed in India. The impression of modern literature is that lithotomy is seldom necessary and seldom performed. This surely cannot be the case in the practice of surgeons in India. In very contradiction to this impression a recent annual report¹ of the work of the dispensaries in one of the large provinces in India shows 446 lithotomies and 331 litholapaxies, although nearly every dispensary is supplied with litholapaxy instruments. The work of Keegan and Freyer and other modern operators settles the question beyond doubt that lithotomy in adults is seldom necessary. It is, in fact, unjustifiable except for special cases (as for instance a very large or very hard stone). The difference in the mor-

¹ Annual Report on Work of Dispensaries in N.-W. P. for 1898, the latest available report.

tality attendant on lithotomy and litholapaxy should lead to this opinion. Lithotomy in adults, in experienced hands, has a mortality of 15% to 18%,¹ while litholapaxy has a mortality of 3% to 4%. Freyer has done 342 litholapaxies with only 4 deaths.² These facts alone should make lithotomy a rare operation. Why then is lithotomy still so largely performed in India? What justification have surgeons in India for the large number of lithotomies shown in the returns, when an operation with a much lower mortality can be performed: The following seem to me to be some of the reasons why lithotomy is and will probably still continue to be largely performed:—

Firstly.—A very large number of our stone patients in India are children. The mortality of lithotomy in Indian children is very low. In the Indian child the operation is remarkably successful. Freyer has done 200 lithotomies in children with one death; in fact he did 191 with no deaths.³ While he does 172 litholapaxies and has two deaths. Keegan in 160 litholapaxies in children has seven deaths or 4.3%.⁴ This shows that lithotomy in the hands of a surgeon in Indian practice may be as successful as litholapaxy. Even with English operators the mortality of lithotomy is not a very high one. Sir H. Thompson has collected statistics of 1,028 cases by various operators, with a mortality of 6½%.⁵ With Indian children the mortality figure is a much lower one than this.

Secondly.—The difficulties of the two operations are by no means equal. Freyer says of litholapaxy: "The operation is undoubtedly a difficult one, perhaps the most difficult in the whole range of operative surgery."⁶ Captain Duer of lithotomy says: "after the operation has been performed a few times it will be found quite simple." Keegan insists that no one should attempt to perform litholapaxy in children, so delicate is the operation, till he has gained experience in adults.⁷ Sir William Fergusson says of lithotripsy: "I know not any process in surgery requiring more forethought, knowledge or manipulative skill." Thus litholapaxy, in the opinion of experienced surgeons, is by no means an easy operation; while I believe most surgeons in India will agree with Captain Duer that, with some experience and due care, lithotomy is a comparatively simple operation.

Thirdly.—Apart from the difficulties of the operation, the facility and quickness of the two are by no means equal. Litholapaxy is often a tedious operation, taking up a considerable

amount of time and labour, so that one's back aches at the work, especially in the hot weather. Freyer says: "The amount of manual labour required for dealing with large calculi is excessive. My hands were often blistered, and my arms frequently ached for days after performing litholapaxy in one of these cases."⁸ Lithotomy, on the other hand, is performed quickly, effectively and with little labour, in a comparatively short space of time. Time, labour, and trouble would not be worth our consideration, if, on their account, we were led to do an operation involving a greater risk, but since lithotomy in children in India is attended with such success, and such a low mortality, they are points of consideration, and, I believe, are factors which determine many surgeons in India, who are doing hard work in a hot climate to do the easier and quicker operation of lithotomy.

Fourthly.—In selecting to perform lithotomy the operator probably feels that he is going to do an operation not only suitable and very successful in children, but also one which will completely remove the present cause of trouble in the bladder, there is some satisfaction to him that no portions of stone are left behind and that 96 per cent. of his patients will probably make an uninterrupted recovery. In litholapaxy, on the other hand, although also suitable to children, yet in children more than in adults fragments are liable to be left behind. These have then to be passed painfully by the urethra, which is delicate in children, or else they remain to set up cystitis or become the very best nucleus for a new stone formation. This reasoning is probably also a cause why lithotomy is still largely performed.

There seem to be no statistics about the recurrence of stone in India after litholapaxy or after lithotomy. Sir H. Thompson says 16% and Cadge says probably 20% of lithotripsy cases have recurrence of stone.⁹ Freyer and Keegan do not quote any figures, but they think recurrence is as frequent after lithotomy as after litholapaxy.¹¹ It seems reasonable to think that recurrence after litholapaxy is largely due to fresh deposit round an old fragment. It is certainly difficult to make certain that all fragments have been removed. The painful micturition, blood tinged urine and cystitis which sometimes occur after litholapaxy are probably as much due to small fragments as well as to injury caused by the instruments to a delicate mucous membrane. And the views that Sir H. Thompson and Cadge that recurrence is more frequent after crushing, although their figures seem rather high, are probably correct.

Apart from exceptional cases, such as inability to pass the lithotrite or a very large or hard

¹ Modern Treatment of Stone, p. 59.

² British Medical Journal, May 9th, 1891.

³ Modern Treatment of Stone, p. 79.

⁴ Lancet, October 4th, 1890.

⁵ Modern Treatment of Stone, p. 60.

⁶ Ibid, p. 52.

⁷ Indian Medical Gazette, April 1900.

⁸ Indian Medical Gazette, September 1885.

⁹ Modern Treatment of Stone, p. 66.

¹⁰ British Medical Journal, July 3rd, 1886.

¹¹ Modern Treatment of Stone, p. 56.

stone, the above seem to be some of the reasons why lithotomy is still so largely performed. In the face of the present statistics and the splendid results of litholapaxy, by which the mortality in the treatment of stone has been reduced from 18% to 3 or 4%,¹ the number of lithotomies still performed in India seem very high, and without some good and reasonable explanation, the number is not creditable to the progress made by surgery in India. A few cases may still be due to want of instruments, a few cases to oriental conservatism on the part of native operators, let us hope a very few, if any, are due to the fact that lithotomy is easier, quicker and less troublesome. Each individual operator can alone justify himself in performing lithotomy by the success which he has attained in his work on children. In the adult, except for special cases the operation is unjustifiable, and even in children his results must be very good indeed to justify him in subjecting the life of his patient to the greater risks of lithotomy when litholapaxy has been shown to have a much lower death-rate.

SOME CASES OF STONE OPERATED ON BY A CIVIL HOSPITAL ASSISTANT.

By VENAYAK SUBHARAM KELKAR.

Athni Dispensary.

A BOY, named Babaji Bin Bhimanna, aged 12 years, native of Athni, was admitted into this dispensary, on the 18th August 1899 for the treatment of stone, from which he was said to be suffering for the last eight years. He was of a Kai-Kadi caste, and was very weak and emaciated. He was given castor oil in the morning of the day previous to the operation. The bowels were well opened. An enema of castor oil with tepid water was given early in the morning. Brandy (three drachms) with equal quantity of water was given half an hour before he was placed on the operation-table. He was brought under the influence of chloroform, and was brought on the margin of the table with hands and legs well tied together. Lateral incision was made and finished with the aid of the left index, well fixed in the grooved staff, already introduced in the bladder, firmly against with the symphysis pubis. In the meantime the knees were well raised up and held rather in an outward direction. The left index finger was then introduced into the bladder and on ascertaining the size of the stone, a middle-sized forceps was put into the bladder along with the finger. The stone was caught between its jaws, and, while

pulling it out by rotation, the stone slipped through the blades. On taking the forceps out, it was found that some portion of the stone was attached to the teeth of the blades, one of which was also bent. So another forceps was used in its stead and the stone was caught between its jaws. I held the forceps while pulling it out rather forcibly by rotation; the stone was fortunately broken at the very commencement. The pieces were removed, but the central portion, which was rather a little smaller than a hen's egg, was removed by the forceps. As the stone was composed of triple phosphate of lime, its superficial layers gave way on account of the teeth of the blades being very prominent and sharp. On being weighed the stone was 34 drachms. The boy died on the third day, of cystitis most probably, as the relatives would not allow me to make a *post-mortem* examination. I only wish to bring this case to the notice of your journal readers. Considering the age of the boy and the enormous size of the stone it would have been unusual to expect that he would survive so difficult an operation.

Another case of a stone in a boy, named Sakharan Subana, aged 10 years, resident of Jakaratti in this *taluka*, was admitted into dispensary on the 29th October, and usual lateral lithotomy was performed in the manner described above. The weight of this stone was 5 drachms and 30 grains. The boy was discharged completely cured. This case was seen by Dr. Willis, the Civil Surgeon, Belgaum, while on his inspection duty, who expressed his satisfaction.

The instruments used in all these cases were not of English make but of Indian make, and they were manufactured by a blacksmith at Karhad in the Satara District.

A photo. of these stones extracted by me is herewith attached for your notice. Fourteen stones were removed in Karhad, three in Patna, while I was in charge of those dispensaries, and three in this dispensary. All these cases except two were completely cured.

All these operations were performed without any medical assistance.

No.	Weight.		Age.
	Drs.	grs.	
1	4	54	14
2	1	7	16
3	12	33	13
4	14	0	18
5	7	0	5
6	1	45	6
7	1	18	55
8	2	4	5
9	4	38	15
10	0	40	50
11	0	43	3
12	5	30	10
13	34	0	12

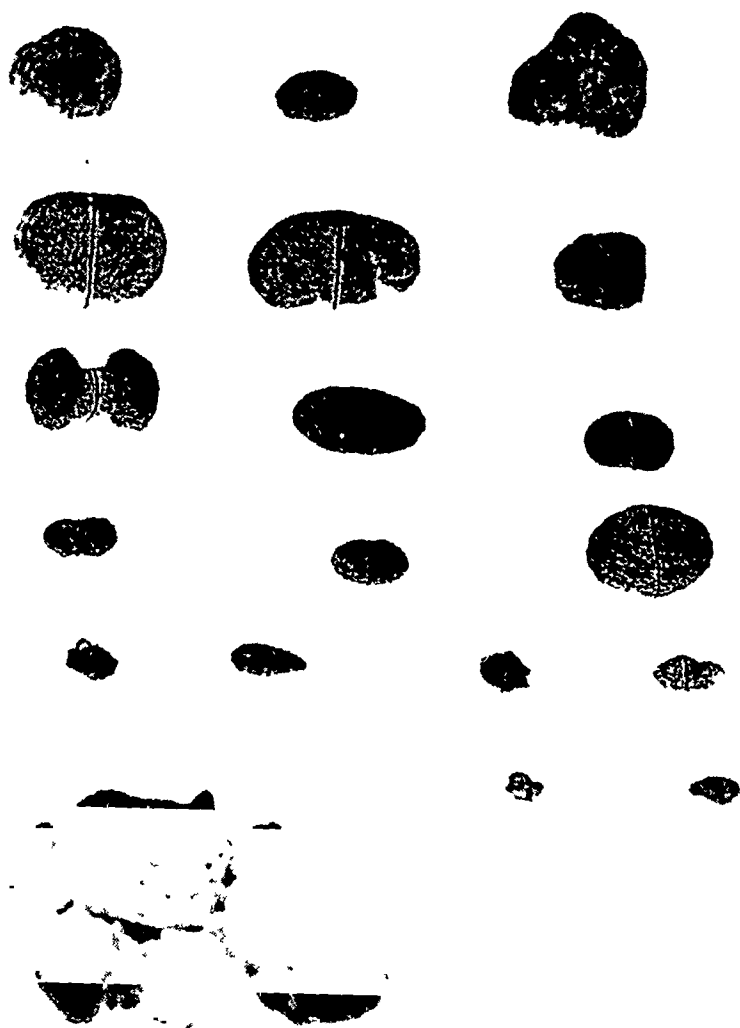
All other small stones were extracted from small children, and their weights varied from 25 grains to 55 grains.

¹ Modern Treatment of Stone, p. 57.

[A glance at our columns headed "Replies to Circulars" will show that many operators do lithotomy from necessity rather than choice, not having the necessary lithotrites, &c. —Ed., I. M. G.]

SOME CASES OF STONE OPERATED ON BY A CIVIL
HOSPITAL ASSISTANT.

By VENAYAK SUBHARAM KELKAR.



THE
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OUR SPECIAL NUMBER.

THE present number of the *Indian Medical Gazette* is a special one, entirely devoted to questions connected with stone in the bladder and the various operations for the relief thereof. The fact that stone in the bladder is a very common disease in many parts of India is well known, but when we attempt to consider the causation of that prevalence we are met with many difficulties. The question is unsettled in India as it is in England. We can no more say with certainty why stone is so common in the Punjab and Sindh than we can say why it is common in Norfolk and almost unknown in Ireland. The question is a difficult one and intimately depends upon considerations of physiological chemistry as yet imperfectly understood. One fact is certain that no rough and ready theory will explain the whole case; there is a multiplication of factors. Lime in the drinking water and concentrated state of the urine in the hot weather is a theory which has been put forward by Major J. A. Cunningham, I.M.S., but though we may admit both these as factors, we cannot believe they are the whole of the matter. We believe there are rivers and water-supplies in parts of Madras where we never get stone cases that have as much lime in them as any river in the Punjab or Sindh; nor perhaps is it safe to assume that the chemistry of the body is so simple as to take in lime in the drinking water and pass it into the bladder as a stone. No lime, no calculi say some; possibly so, but yet there is lime where there are no calculi. The other theory, which judging from the remarks of our correspondents is the one which commends itself to the majority, is the dietetic theory first sketched out as regards India by Major A. E. Roberts, I.M.S., in his paper in the Transactions of the first Indian Medical Congress. This theory, which its author still claims to be no more than a broadly stated hypothesis, is that if we look at the distribution of calculus disease in India we are at once met with the fact that in the rice-eating districts of India, Bengal, Assam, Madras, &c., stone is certainly rare, whereas in the wheat-eating districts of the

North-West Provinces, Punjab and Sindh stone is much more common. So much can be stated with certainty, but to go further than this is here impossible. That the staple food of the people has some relation to the prevalence of stone must be admitted, but more than this we cannot say. The amount of salt used by natives of various provinces is possibly another factor, but what extent a small consumption of salt affects the incidence of stone has not yet been worked out. Many considerations point to the co-extensive prevalence of cataract and stone. We must however, leave this part of the subject, and confess that little or nothing is certainly known as to the causation of stone in certain countries, districts and provinces.

To turn to our papers—the one fact that clearly emerges from a perusal of the various papers and opinions that we have here collected together is the extraordinary safety and extraordinary popularity of the operation of litholapaxy, which surgeons in India, rapidly grasping the grand idea of Bigelow, have permanently established as the best and safest operation in all ordinary cases. The statistics given in our various articles, and especially those given by Captain H. Smith, I.M.S., show this clearly. We know of no collection of statistics on the operation which so clearly points out the relative safety of litholapaxy and lithotomy in regard to the ages of the patients—a point long ago emphasised by Sir Henry Thompson.

Another point brought out by these articles is the desire on the part of surgeons for the further extension of the crushing as opposed to the cutting operations—Keith's perineal lithotripsy, the use of the giant lithotrite both point to the popularity of the crushing operation. Lithotomy, however, is not without its advocates, though it is clear that in many cases the surgeon uses it from necessity rather than choice. Nor must the present-day statistics for lithotomy be taken as the best that that operation could produce. By the majority of Surgeons lithotomy is only done when for certain reasons litholapaxy is not applicable, therefore the cases for lithotomy are thus selected in a way which does not make for high class statistical success. To some extent the same remarks apply to the suprapubic operation. A Russian surgeon publishes 102 suprapubic operations with only two deaths. These, as far as we know, represent the total of his operations, that is, he operated

on all cases by this method, hence his success; but in India the suprapubic operation never was popular; it was always reserved for cases of difficulty, hence its high percentage of mortality.

There is another important point to be considered before we conclude—that is, the very unequal equipment of different hospitals in the matter of lithotrites. A glance at the replies to our circular will show that many surgeons do lithotomy rather than litholapaxy, as we said above, from necessity rather than choice. Most hospitals have their time-honoured case of lithotomy instruments, but only a few have complete sets of lithotrites. To be able to meet every case of stone by the operation of litholapaxy the experienced surgeon should have the following lithotrites—5, 6, 8, 10, 12, 14, and 16 (Weiss); for a well-equipped hospital we would add a No. 4, 20, and a “giant” lithotrite. To provide these with canulas, aspirators, &c. considerably over £60 is necessary, and we cannot but admit that every municipal dispensary cannot afford so much for one class of operation, but they could be got gradually, and the stock kept up in good repair. We commend the remarks on this subject by Dr. Keegan in the above article to the attention of Administrative Medical Officers and to the Local Governments.

HISTORICAL SKETCH OF STONE IN INDIA.

“We must see for ourselves what is to be the future operation for the vast majority of calculi we meet with in India. Our opportunities for treating stone are simply unrivalled, and we need not look to England or indeed to any country in Europe for guidance.”

D. F. KEEGAN.

(*I. M. G.*, p. 42, of 1889.)

SOME OLD INDIAN STATISTICS AND NOTES ON OPERATIONS FOR STONE.

IN connection with the papers which we publish in this issue it will be interesting to our readers to reproduce some notes on the operations for stone made in olden days, most of which are taken from the early volumes of the *Indian Medical Gazette* and the *Indian Annals of Medical Science*.

In *Indian Annals* (vol. 3, p.45) for the year 1854 we find a long article by Dr. A. Simpson,

M.D., I.M.S., Civil Surgeon of Tirhoot. The following is an abstract of his tabular statement. (186 cases.)

Triple phosphate calculi	... 48	} 68 Phosphates.
Phosphate of lime	... 10	
Fusible	... 1	
Uric acid calculi	... 55	} 76 Urates.
Urate of Ammonia	... 21	
Oxalate of lime	... 42	
Percentage of Phosphates	... 36.6	} Oxalates.
“ “ Urates	... 40.6	
“ “ Oxalates	... 22	

Most of these were extracted in Tirhoot and Sarun Districts of Bihar. The mortality of these cases “up to the healing of the wound” was 4.8 per cent. The causes of the mortality in the eight fatal cases were diseased bladder and kidneys one case, “typhoid peritonitis” (*sic*) one, exhaustion from chronic bowel and spleen disease five cases, from epidemic cholera one. Total eight or 4.8 per cent. The calculi varied in size, (average four drachms) from ten grains to seven and half ounces, the latter was an oval, white, smooth and polished phosphate of lime calculus. Dr. Simpson remarked that native operators usually cut in the median line in front of the anus, the rectum being often wounded and fistula often results. In one case a calculus had again formed and “the lateral operation relieved him of both calculus and fistula.” In only one case did he meet with dangerous hæmorrhage from cutting an artery in dividing the prostate. Before the introduction of chloroform Dr. Simpson used to give the patients “a glass of brandy with laudanum,” but since the use of chloroform this was not necessary, though he always gave an opiate after the operation. He notes that he never had a case of encysted calculus. Prolapse of the gut, he notes as common in children suffering from stone, this often takes place on introducing the staff or at the first incision. “In operating,” he writes, “I have always practised the lateral operation, using the knife to open the bladder. If the patient is steady, I make both incisions with an ordinary sized scalpel, with a cutting edge an inch in length from the point, the edge of the remainder of the blade being taken off.” Before the introduction of chloroform (in the first forty cases), Simpson made a free section of the prostate, “so as to extract the stone with more despatch,” but with chloroform he used a more limited section of the prostate. He found that a sufficient wound is made in running in the knife to allow of the gradual introduction of the finger (causing dilatation) into the bladder and the extraction of ordinary sized calculi. For big calculi he preferred to dilate the wound in the prostate with a probe-pointed bistoury. Before using the forceps he brought the calculus to the bottom of the bladder, if not already there, and as the finger in the wound prevents the escape of urine, on the introduction of the forceps the calculus is usually readily seized.

In all cases he kept in the wound a short silver tube for forty-eight hours, and attributes much of his success to this. For small calculi he preferred the scoop.

In the next volume of *Indian Annals* (p. 611 C. E. Raddock, "Sub-Assistant-Surgeon," Malwa Bheel Corps, gives details of seventy-seven cases, all of which were put under chloroform except one, in three cases "it produced alarming symptoms," and in one a fatal result. Out of seventy-seven cases the death rate was 6·7 per cent. The causes of death in five cases were, "severe hæmorrhage under the influence of chloroform, one; sloughing of bladder, one; inflammation of bladder, two; and fever, one." Of the seventy-seven cases forty-three were in children under twelve, eight in boys under twenty years, and twenty-six in adults, the youngest patient was aged two years and the oldest sixty. The urine first appeared from the penis in thirty-seven cases in five and a half days, in others from seven to ten days. The instruments used were, a straight grooved staff, a common scalpel and forceps. In his later cases Raddock gave up the use of the tube in children; in thirteen cases in which the tube was not used, the first appearance of urine from the penis was in 2·7 days, compared with eight days when the tube was used.

DR. JOSEPH FAYRER ON STONE OPERATIONS IN 1865.

In another volume of the *Indian Annals* (Vol. XIX (1865), p. 21) we find Dr. Joseph Fayrer (now Sir Joseph Fayrer, Bart., K.C.S.I.) speaking as follows at the Annual Meeting of the Bengal Branch of the British Medical Association [Calcutta, which in 1900 cannot support a Medical Society, had more than one flourishing society forty years ago]. Dr. Fayrer complained (and to some extent the complaint holds good still, though thanks to P. J. Freyer, and D. F. Keegan, not with regard to stone) that standard works seldom or never made even a casual reference to the authority, practice or opinion of any Indian Surgeon. "Take lithotomy for example, the fullest and most elaborate details are quoted of the practice of British and Continental Surgeons, yet not a word on the subject relates to India, where some of our graduates have cut as many men successfully for stone as the greatest lithotomists Europe ever saw. . . . I might refer to the names of O'Shaughnessy, Brett, Webb, Playfair, Naismith, Aitcheson, Partridge, Cayley, and others, as of Surgeons who have had experience in this operation that scarcely Frère Jaques, Rau or Cheselden ever exceeded."

Dr. Fayrer then gave some statistics of operations for stone, based on figures collected from 180 stations in the Bengal Presidency.

In Bengal there were 68 cases of lithotomy with eight deaths in the previous six months, or one death in 8·5 cases. In the N.-W. Provinces and Punjab there 555 cases with 57 deaths or one death in 9·9, but in another article in the same volume (p. 427) Dr. Fayrer gives a tabular statement which shows that vesical calculus "is neither of very frequent occurrence in Lower Bengal, nor are the results of the operation very successful." Out of 35 cases operated on in the Medical College Hospital, Calcutta, only 23 recovered, giving a mortality of 34 per cent. or about 1 in 3. Dr. Fayrer was inclined to attribute this high rate to the state of health of the patients on admission, but he also points out that in nearly all death was due to what we should now call "septic" conditions, and in fact he showed that in those days osteomyelitis and other septic diseases had an "endemic prevalence" in the Medical College Hospital. Dr. Fayrer contrasted these figures with a 1 in 10 rate in the N.-W. Provinces. In France it was 1 in 5, and in Europe 1 in 5·14. Mr. (now Sir Henry) Thompson's figures for 1,827 cases were 1 in 7·5 (about 13 per cent.). Fayrer used the lateral operation usually and the median only for very small calculi and usually did not use the tube after operation

LITHOTOMY VERSUS LITHOTRITY IN 1867.

In *Indian Annals* (Vol. XI, for 1867) Surgeon H. M. Greenhow (who still survives, a well-known author) discusses the subject of lithotomy and lithotritry in the Punjab and N.-W. Provinces. This article takes the form of a collective inquiry as to the methods used by Indian Surgeons in doing lithotomy, and their experience of lithotritry. In this way he collected statistics of 1,585 cases of lithotomy at different ages with an average mortality of 1 in 6. It is stated that in the opinion of many Surgeons in India "lithotomy will, in all probability, never be supplanted by lithotritry." This opinion was based upon the following considerations:—(1) that Government were not likely to provide the lithotritry instruments and (2) that natives would not remain long enough in hospital* after lithotritry, whereas in the cutting operation they had to remain till the wound was healed.

At this time, 1867, the experience of lithotritry in India was small, Dr. C. M. Smith of Lahore and Dr. R. T. Lyons had tried it a few times but both preferred lithotomy. From a report of the Lahore Medical College Hospital it appeared that in the three years, 1861-63, there has been

* In this connection Surgeon-General R. Harvey informs us that after he had done his first seventeen cases of lithotritry he had to give it up, because some of the patients bolted from hospital with the half-crushed fragments of a stone in their bladders. This was before the days of Bigelow. We take this opportunity of thanking Surgeon-General Harvey for the loan of several books on stone operations. — Ed., J.M.G.

fifteen lithotrities done, of which 8 were cured, one died, and six were "uncertain in their results," owing to patients bolting before the cure was completed. Dr. Scriven, the Principal, Lahore Medical College, advocated lithotripsy in old men and in women. Dr. Greenhow concluded his discussion of the subject with the remarks that "lithotripsy has not had yet a fair trial in India, but it is improbable that it will ever supplant lithotomy, except possibly in the case of old men." The operation success at this period was in India 1 in 6.6, but varied from 1 in 3 with Dr. J. Fayrer in the septic old Medical College, Calcutta, to 1 in 40 in the hands of Dr. Smith at Lahore. Out of a total of 1,088 collected Indian cases there were 1,064 lateral, 18 median, one suprapubic, and five of Dr. Murray's operation (this was a modification of the lateral operation); the average weight of the calculi was 7 drachms 42 grains. The largest stone in the series was one extracted at Sialkote (operator's name not given), it weighed 11 oz, the patient died six days after of diffuse cellulitis. It is also stated that many of these patients had been operated upon three or four times. In one case 12 stones were removed, and 3, 4, and 5 stones were quite common.

In *Indian Annals* (Vol. II) Mr. J. J. Durant gives an account of 21 cases, with two deaths, which he operated on in 1855-56. He advocated preparatory treatment with alkalis and bladder sedatives, the use of chloroform, the lateral incision, with as limited a section of the prostate as possible. He seldom used the silver tube, and he washed out of the bladder immediately after the operation.

LITHOTOMY IN SAHARANPUR IN 1868.

In *Indian Annals* (Vol. XXIII of 1868), Dr. A. Garden, Civil Surgeon of Saharanpur, gives an account of 831 cases of vesical calculus, collected from the records of the Saharanpur dispensary; of these 824 were males and only 7 females. Of the male cases treated (824) 716 recovered and 108 died, or a mortality of 1 in 7.6 (13 per cent.). He examines the question as to which season is the best for operating, the Native opinion being that the rainy season is not a good time for operations, but the statistics quoted by Dr. Garden, on the contrary, show that the rainy months actually produced the best average. It is also concluded that both Hindus and Mahomedans are equally liable, in spite of certain differences in dietetic habits. As regards causation of calculus Dr. Garden considered that exposure, irregular meals, habitual use of inferior and indigestible grains, "and last but not least malaria affecting and deteriorating the whole system" must be considered as predisposing and exciting causes. As regards age-liability the Saharanpur figures showed more than one-third

of the total in children under ten years of age, "then a fall in the second decade and a rise in the third to fall afterwards period by period as life advances."

The smallest stone in this series was ten grains and the largest $8\frac{3}{4}$ oz. It is also shown that the mortality increased in proportion to the weight of the stone. Other tables claim to show that "the longer a patient has suffered the smaller his chance of surviving the operation."

As regards the causes of death after operation Dr. Garden considered peritonitis "to be undoubtedly the most common" (31 per cent. of the total deaths). The causes of the peritonitis were regarded as "the epidemic constitution of the atmosphere," and "accidents incident to the operation in unskilled hands." "Exhaustion and collapse" were the next most common causes of death. Dysentery is also noted as a "not unfrequent" cause of death. Dr. Garden always used the lateral operation; he also noticed the common occurrence of prolapsus ani, especially in children. Disease of the kidney, he considered "most decidedly forbids any operation." Failure to enter the bladder during the operation, he agreed with Sir Wm. Ferguson "is much more likely to occur than most surgeons imagine." Out of 824 cases only one stone was noted as "encysted" In 12 cases single or double orchitis is noted as a complication after operation. Of the cases analysed the nature of the stone was as follows: Fusible, 15 cases; Triple Phosphate, 1 case; Phosphate of Lime, 3 cases; Uric Acid, 81 cases; Urate of Lime, 55 cases; Urate of Ammonia, 23 cases; and Oxalate of Lime, 72 cases.

SURGEON-MAJOR W. POULETT HARRIS'S BOOK ON LITHOTOMY.

In 1876 Surgeon-Major W. Poulett Harris, of the Bengal Medical Service, published a volume on Lithotomy (J. & A. Churchill) based on his experience of that operation in India. In the preface the following remark occurs: "No reference has been made to lithotripsy as I, following the general custom of Surgeons in India, have never practised it." This was written in 1876, just two years before Bigelow's introduction of litholapaxy revolutionised the practice of surgeons in India.

The volume, however, is a very practical treatise on the old operation, and gives full details for the benefit of the young lithotomist. He gives the following statistics:—

Left lateral operations, 299 cases, of which 191 were children, ratio of death was 1 in 11.9 or about $8\frac{1}{2}$ per cent.

Recto-vesical operations, 185 cases; the ratio of deaths was 1 in 4.87, or close on 20 per cent.

Dupuytren's bilateral operation.—In 112 cases, the ratio of death was 1 in 4 or 25 per cent.

Suprapubic operation.—In 268 cases the ratio of deaths was 1 in 3, or 33 per cent.

In his first chapter Surgeon-Major Harris gave some remarks upon the subject of the causes of urinary calculi. He stated that in countries where it is most prevalent there are frequently cold and piercing winds such as Norfolk, Eastern Scotland, Rohilcund and other districts of the North-West Provinces of India which lie under the influences of cold winds blowing off the Himalayas. In very cold and in tropical regions which are not subject to sudden atmospheric vicissitudes stone is said to be rare. "Malarious influences" are mentioned on the authority of Dr. Prout. "It has been repeatedly observed that urinary deposits are common in persons living in limestone districts, owing to derangement of the digestion caused by the use of hard waters." The food is often at fault; in Norfolk we have coarse dumplings, and in N.-W. Provinces the ordinary diet of the population is heavy unfermented bread, made from the admixture of several kinds of cheap grain. Mr. Cadge, of Norfolk, considered as causes the universal consumption of malt liquors, the constant daily use of exceedingly hard drinking water, and the accumulated effect of hereditary predisposition.

THE DAWN OF LITHOLAPAXY.

In the *Indian Medical Gazette* for 1882-83 two papers appeared by Surgeon P. J. Freyer, giving his experience of his first twenty cases of litholapaxy. In March 1884 (*I.M.G.*) Dr. Freyer gives an account of 57 more litholapaxies. In this paper he endeavours to estimate the value of the operation of litholapaxy. Of the 57 cases only two were fatal, one from peritonitis and the other from pyæmia. Dr. Freyer points out the importance of removing the whole of the calculus at one sitting, no matter how long the operation may take. "An operation prolonged over several 'sittings' involves all the dangers of the old operation of lithotomy." One case here reported is the removal of 9½ drachms of uric acid calculus from a man aged 95. Freyer thought that old men were less liable to urethral fever than young men. He also gives a remarkable case of spontaneous disintegration of a calculus in the bladder.

Freyer also brought forward a new method of diagnosing very small stones by use of the aspirator "when a distinct click was at once felt during exhaustion of the water from the bladder, due to the calculus being carried with force against the eye of the canula by the outward stream." It is also pointed out that very small calculi may even be evacuated through the aspirator.

Freyer concluded "I cannot speak in terms of too high praise of Bigelow's operation. By its introduction the operative surgery of stone

has truly been revolutionised." Freyer at this time (March 1884) had done 79 cases of litholapaxy with only three deaths. He concluded by remarking that "as yet no instruments have been invented by which litholapaxy can be performed with safety in males below the age of puberty."

LITHOLAPAXY IN CHILDREN.

THE above statement is shortly after (May, 1884) challenged by Surgeon-Major D. F. Keegan, of Indore, who by his cases proves "that litholapaxy can be performed on male children of tender years with a great measure of success." He gives a table of 24 cases of litholapaxy done at the Indore Hospital on male children with only one death. Dr. Keegan notes that *Surgeon-Major T. Beaumont was the first to perform Bigelow's operation in India*; this was in 1880, and Dr. Keegan also gives Beaumont the credit of having been the first to apply the operation to children, an operation which Keegan himself has taught the profession to recognise as the correct one. Dr. Keegan describes the hesitation he felt in first applying litholapaxy to children, the cutting operation was so successful, but his success in his earlier cases was such that he could strongly recommend the operation to the profession. In this year we also find Mr. Arthur Neve, of Kashmir, drawing attention to certain advantages of the suprapubic method.

FURTHER EXPERIENCES IN LITHOLAPAXY.

In the *Indian Medical Gazette* for August, September and October 1888, Dr. D. F. Keegan related his experiences of treating 76 cases of stone in the bladder, with four deaths. Since that date he had 100 more operations, which are published in January 1890 (*Indian Medical Gazette*, p. 2). Of this 100 there were 31 litholapaxies on male children, and 64 litholapaxies on adults, the mortality for the 100 cases was three. He notes that further experience of the operation of litholapaxy in children has strengthened his conviction that litholapaxy is the best method of extracting the vast majority of calculi to be met with in the bladders of male children and boys; but the surgeon must provide himself with a large assortment of fully fenestrated lithotrites of small size from 4½ or 5 (English scale) to No. 10. Dr. Keegan in this paper called attention to a difficulty which every surgeon was bound sooner or later to meet, *viz.*, the impaction of a piece of debris of a hard stone in the eye of the evacuating catheter. He determined to get solid steel stylets to avoid this.

Dr. Keegan then goes on to discuss a point raised by Mr. Jacobson, *viz.*, whether recurrence of the stone was common after litholapaxy in children, and Dr. Keegan replies that recurrence

does not follow any oftener than it does lateral lithotomy. Such recurrence, due either to fresh stone from the kidneys, or to piece of débris left behind, is occasional after litholapaxy in old men, but where the recurrence is due to débris it is because the bladder was not thoroughly evacuated owing to enlarged prostate or sacculated bladder, therefore in boys it is only if the operator is careless that this occurs. Dr. Keegan here also notices the old comforting fallacy that operators in England surround themselves with, *viz.*, that the patients were "Natives"; but Dr. Keegan retorts that he would perform the operation on an English boy with even more hope of success. This "wonderful immunity" of natives exists only in the imagination of English surgeons and writers of lesser experience. As a matter of fact many of Dr. Keegan's patients were "ill-fed, emaciated and suffering from the effects of chronic malarial poisoning." Dr. Keegan notes that Surgeon-Majors Freyer, Goldsmith and Dennys had also done many litholapaxies with great success. The figures for the operation in Punjab and North-West Provinces are collected, and it is stated that out of a total of 246 cases of litholapaxies done in children there are only six deaths, or under 2·5 per cent. He advises inexperienced surgeons not to try litholapaxy on large stones, and when they have done some litholapaxies on male adults to try the more difficult operation in male children.

The following table sums up Dr. Keegan's results as given in the paper quoted:—

Average weight of stones removed by litholapaxy from adults ...	259 grs.
" stay in hospital adults ...	5·3 days.
" age of boys on whom litholapaxy was done ...	5·3 yrs.
" weight of stones removed from boys by litholapaxy ...	71 grs.
" stay in hospital by boys after litholapaxy ...	2·4 days.

Encouraged by the success of the operation of litholapaxy for children in the hands of Drs. Keegan and P. J. Freyer, we find many other surgeons taking to the operation. Surgeon Dennys (*Indian Medical Gazette*, November 1888) in reporting thirteen cases of the operation refers to a few cases done by surgeons in England. Dr. Dennys' thirteen cases were all successful, the average age of the boys was 7·5 years and average weight of the stones 225 grains.

TEN YEARS OF LITHOLAPAXY.

In *Indian Medical Gazette* (July 1892) Dr. Keegan published an article in which he gave a sketch of the ten years' experience which litholapaxy had had in India, "and now after a lapse of these years" (he writes, p. 204) "I have no hesitation in stating that it is far and away the best operation for the vast majority of the calculi the surgeon meets with in boys, provided

he has a large assortment of trustworthy instruments to hand and that he knows how to use them with dexterity and judgment."

Dr. Keegan refers to the spread of the operation, how that Surgeon-Major Caldecott had done 38 consecutive successful litholapaxies on boys at Indore, that Freyer had done 129 with only two deaths. Goldsmith did 52 litholapaxies with two deaths at Baghelkhand, and Gimlette 59 with only 1 death at the same place, Dennys 71 cases with three deaths, J. A. Cunningham 24 cases at Mooltan without a death, T. H. Hendley 17 cases with one death at Jeypore, and O'Connell Raye 4 cases and no death. Adding these to the Indore figures we get 506 litholapaxies in boys with 13 deaths, a mortality of 2·5 per cent. To perform litholapaxy with success Dr. Keegan stated that a surgeon should possess 6 lithotrites, 6 evacuating catheters, and 2 débris extractors or aspirators. This would cost about £50.

FORBES-KEITH'S METHODS AT HYDERABAD, SINDH.

Perineal Lithotrity.

In the *Lancet* (June 4th 1892) Surgeon-Major J. Forbes-Keith, then Civil Surgeon of Hyderabad, Sindh, had an article on the "complete abandonment of the operation for removing calculi entire from the bladder." In three years at Hyderabad he did 739 operations for stone. The operation he does he calls lithotrity, "aspiration as an integral part of the operation being almost if not entirely abandoned." "Lithotrity is always done when the screw of the largest lithotrite the urethra can readily admit, coincides with the diameter of the stone." One exception to this rule is in cases where the hammer-and-chisel method is used (see below). Instead of the aspirator he used an Indiarubber tubing and catheter attached to an over-head irrigation tin, full of boracic lotion. The most interesting part of this article is however Keith's description of what he called "perineal lithotrity." "When the diameter of the stone is too large for the screw of the largest lithotrite the urethra can readily admit, then recourse is had to the second method" or perineal lithotrity. The following is the description of the operation. "I introduce a grooved staff into the bladder, then taking a sharp pointed narrow bladed knife, and holding the staff up against the angle of the pubis, insert its point at the angle formed by the root of the penis with the perineum, and push it upwards and slightly backwards into the groove of the staff, and keep it there. I then take a small director and push it alongside the knife into the groove of the staff, . . . then removing the knife I push the director home into the bladder and withdraw the staff." Then taking a lithotrite which will fit the stone (this has been measured by a lithotrite introduced by the urethra), if necessary the wound

may be enlarged. The point of the lithotrite is gently introduced along the groove of the director with the handle downwards. When the jaws of the instrument have been completely introduced into the wound, by simultaneous movements the director is withdrawn, and raising the lithotrite upwards to the perpendicular by a sweeping motion to the right, it is gently pushed into the bladder. The knife is not to be pushed along the groove of the director or the prostate may be wounded, and the great aim of the operation will be lost, *its end and design being to preserve both the structure and the function of the prostate intact*. The débris is removed in the ordinary way by the evacuating catheter and aspirator. In this method the aspirator is necessary. For still larger stones Keith inserted his perineal lithotrite, which is two sizes larger than the largest lithotrite the urethra will admit.

Keith summed up as follows the advantages of this method:—(1) Non-interference with the structure and functions of the bladder; (2) smallness of wound and no important struc-

described in another page. The third method described by Keith, is called the "hammer and chisel" method. It is only used for stones which are too large for the operation just described. The operation is as follows:—A median incision is made through the perineum into the bladder, the opening being large enough to admit the largest sized lithotomy forceps. The stone is firmly gripped by the forceps, and a small pointed chisel is pushed in till it is firmly planted on the stone, which is held firm in the forceps by an assistant, a few taps, if soft, will break the stone, if hard, more force is required, if any splinters project outside the forceps these must be chipped off with a crescent edged chisel. In this way Keith removed seventeen ounces of débris. It is only needed in very exceptional cases, say 4 in 1,000.

In a further article in the *Lancet* (September 30th, 1893) Keith gave his further experiences of the above methods, giving details of several cases. He also gives the following table summing up five years' experience of the various operations, showing the abandonment of the

TABLE (KEITH'S OPERATIONS AT HYDERABAD).

	1889.			1890.			1891.			1892.			1893.*			TOTAL.		
	Number.	Deaths.	Per cent.	Number.	Deaths.	Per cent.	Number.	Deaths.	Per cent.	Number.	Deaths.	Per cent.	Number.	Deaths.	Per cent.	Number.	Deaths.	Per cent.
LITHOTOMY.																		
Men	91	14	15.3	54	6	11	15	5	33	3	1	33	...	...	...	163	26	15.9
Children under 15 years ...	103	2	1.9	101	1	0.0	...	...	...	...	...	...	...	...	...	204	3	1.4
Women ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
LITHOTRITY (URETHRAL).																		
Men	11	2	18.0	50	9	18.0	50	5	29	130	3	2.3	208	1	0.4	449	20	4.4
Women	5	...	...	11	...	...	6	...	...	12	...	...	15	1	7.1	49	1	2.0
Children under 15 years ...	...	...	...	...	...	...	165	2	1.2	186	2	1.0	152	...	...	503	4	.7
LITHOTRITY (PERINEAL).																		
Men ... ..	...	...	...	...	...	...	40	2	5.0	7	1	14.0	4	...	...	51	3	5.8
Women ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Children under 15 years ...	...	...	...	...	...	...	39	...	...	38	...	...	29	...	...	106	...	...
GRAND TOTAL ...	210	18	8.5	216	16	7.4	315	14	4.4	376	7	1.8	408	2	0.5	1525	57	3.7

* Up to end of July 1893 only.

tures cut; (3) no hæmorrhage to speak of; (4) the scientific accuracy with which the operation can be performed; (5) urine as a general rule passes, almost if not entirely, through the urethra; and is always a voluntary act; (6) the bedclothes are kept dry; (7) speedy recovery; (8) no danger of fistulous openings; (9) absence of shock unless the patient be very old, infirm or with a large stone; (10) non-interference with the sexual powers; (11) mortality comparatively favourable (2.6 per cent.). This method of perineal operation will be seen to differ considerably from that of Captain H. Smith, I.M.S.,

cutting operation, the extension of the sphere of lithotritry, the introduction of perineal lithotritry and the comparative mortality of the various operations.

LITHOLAPAXY AT HYDERABAD (SINDH).

In the *Lancet* (September 11th, 1897) Major Richard Baker, then Civil Surgeon of Hyderabad, Sindh, published details of 204 cases of litholapaxy, making with 200 cases published before (*Lancet*, October 10th, 1896) a total of 404 cases operated on in one year. In the first

series of cases there were several cases of Keith's operation (perineal lithotripsy), but only four in the second series; this, wrote Major Baker, is not because he valued Keith's operation the less, but because having a No. 5 fenestrated lithotrite (Weiss) made on Keegan's pattern, he seldom met with a case in which the infantile urethra was too small for the ordinary operation.

Of the 204 cases reported there was only one death. The patients' ages varied from eight months to seventy-eight years. There were 106 cases in male children under fifteen years. The average number of times the lithotrite was introduced was 1.6 times only. The average duration of the operation was twelve minutes nineteen seconds. The average weight of the stone was 2 drachms 46 grains. The average stay in hospital 18 days. Mortality only .49 per cent. (Under one-half per cent.).

THE BEST METHODS OF REMOVING LARGE CALCULI.

Dr. P. J. Freyer discussed this question in an article in 1896 (*British Medical Journal*, November 7, p. 1370). He begins by assuming that it has been proved beyond the shadow of a doubt that litholapaxy after Bigelow's methods is the best for all small or moderate sized calculi at all ages. The question therefore only remains as regards large stones. *What is a large stone?* This depends upon the age of the patient and the experience of the operator. He then defines a "large" stone as one of 2 oz. and upwards.

He stated that for a small or moderate stone stricture of the urethra is no bar to a successful operation, the stricture being cut internally or rapidly dilated before the operation, but for a large stone when the repeated introduction of instruments is necessary, the passage of the lithotrite, &c., over this recently divided surface is not good for the stricture, therefore for a large stone, with a urethral stricture, lithotomy should be performed.

Again, in some cases where the prostate is much enlarged, and the urethra tortuous lithotomy must be done. He then gives a useful hint in dealing with large stone:—if the lithotrite will not produce any effect on the stone in one axis, catch it in another axis and by repeating this process often it will be found that the stone will yield, or by pieces being broken off the stone will soon become of a size which the lithotrite can grasp. In cases where the bladder is thickened and hugs the stone and the bladder will not hold any water injected, then lithotomy must be done. Dr. Freyer showed that the more expert he became with litholapaxy the less did he need to resort to the cutting operations. At this time he had had no experience of Brigade-Surgeon Keith's

operation of perineal lithotripsy. The article is concluded in the following words:—

"With results such as these before me I have no hesitation in pronouncing Bigelow's method the safest and best for calculi of all sizes, in patients of all kinds and conditions, provided only that this operation is feasible. When not practicable, I consider that calculi up to about three ounces in the adult, and a corresponding weight in the child, are best removed by perineal lithotomy; beyond that, suprapubically. Six and one-eighth ounces is, as I have said, the largest stone that I have removed by Bigelow's method; but still larger calculi have been successfully removed by Keith, Keegan, and Cunningham in India, and by Milton in Cairo. So fully convinced am I of the vast superiority of Bigelow's operation over all others in saving human life and suffering, that I would lay it down as an absolute rule that in no case, whether in the male or in the female, the adult or the child, should a stone, whether small or large, be subjected to a cutting operation till after trial litholapaxy is found to be not feasible."

THE REVIVAL OF SUPRAPUBIC LITHOTOMY IN ENGLAND.

Dr. Keegan wrote (*loc. cit.*, p. 167) "Surgeons in India are not and never have been, enamoured of suprapubic lithotomy in its application to small uncomplicated stones in young males, and they have steadily refused to follow in the footsteps of their brethren in England and Europe generally." The history of the revival of this operation in England is a curious one. Submitted to the favourable consideration of British Surgeons by its distinguished advocate, Sir Henry Thompson, as the best method of dealing with very large stones in adult males and youths, it was suddenly seized upon by a number of in-experienced lithotomists, as the safest method in their hands, of dealing with small stones in male children, and the good old lateral lithotomy which had stood the test of time had to give way to its fashionable rival. But the pendulum has swung back, and Cheselden's operation will regain the position it should never have lost, but brilliant and successful as lateral lithotomy has proved in dealing with the majority of calculi in young males, it must not be forgotten that in three very important respects it is an inferior operation to a well-performed litholapaxy. The cure is more rapid and the percentage of success greater in litholapaxy than in lateral lithotomy, and it has the additional advantage that it is an operation in which the knife is not used. . . . No Surgeon who has been deprived of opportunities of learning the practical use of the lithotrite need be ashamed to confess that he feels himself unequal to performing litholapaxy on a young boy. . . . The extension of litholapaxy to cases of stone in boys has reduced the mortality following stone operations in this class of patients by more than 50 per cent. to what it was 10 or 12 years ago. Surgeons in all civilised countries should note the very important work

which is being done at the present day in the surgery of stone in the bladder, and it would be well if they would shape their practice in accordance with the methods which obtain in this unrivalled field for experience in this special branch of surgery.

THE COMPARATIVE SAFETY OF LITHOLAPAXY AND LATERAL LITHOTOMY IN BOYS.

DR. KEEGAN discussed this question (*Lancet*, Jan. 16th, 1897). Mr. H. G. Borling had published statistics (*British Medical Journal*, May 5th, 1894, and March 9th, 1895) which showed that lateral lithotomy and litholapaxy are safer operations in boys than the suprapubic operation. Dr. Keegan adds that this opinion is in accordance with Indian experience, and "suprapubic lithotomy in boys has made no progress in India and is never likely to do so." This is made clear by the following table collected by Surgeon-Colonel O'Connell Rave (then Inspector-General of Civil Hospitals in the Punjab):—

TABLE.

STONE IN THE BLADDER IN BOYS.
OPERATIONS IN THE PUNJAB IN THE YEAR 1895.
(Boys up to 15 years of age.)

Nature of operation.	No. of operations.	Average age of boys.	Average weight of stone (grains).	Average stay in hospital after operation.	Percentage of mortality.
Litholapaxy ...	509	6·3	151·5	6·5	2·35
Lateral lithotomy	267	6·90	201·0	24·0	5·24
Suprapubic ...	2	10·0	993·5	38·0	<i>Nil.</i>
Median lithotomy	2	6·	155·0	18·	<i>Nil.</i>

At the *British Medical Association* in 1895 Mr. Jonathan Hutcheson cited Dr. Keegan as an example of "personal specialism in crushing stones in children," but Dr. Keegan says he cannot now lay claim to any such distinction "for there are scores (he generously says) of surgeons in India at the present day who can crush a stone in a child's bladder as well, if not better, than I can."

LITHOLAPAXY IN FEMALES.

THIS question was discussed by Dr. D. F. Keegan in the *Lancet* (January 9th, 1897). Dr. Keegan writes that he takes it for granted that no one nowadays would dream of employing the ancient method of rapid dilatation of the urethra in young girls. There remain therefore two methods, (1) vaginal lithotomy and (2)

supra-pubic lithotomy, but the cases in which these should be employed are few and far between. The following statistics are then given showing the infrequency of stone in females. At the Norwich Hospital, out of 1,125 operations for stone only 50 were in females. P. J. Freyer met with only 17 cases in females out of 864 cases of stone. Brigade-Surgeon Forbes-Keith, I.M.S., treated only 57 cases in females in his 1,993 cases at Hyderabad, Sindh. Of 900 stone cases admitted to the Indore Hospital during 15 years there were only 20 females. It is therefore concluded that stone in the bladder is about 30 times more common in men than in women. Dr. Keegan then gives details of 20 cases of stone in females treated at Indore, 18 out of the twenty of which were treated by litholapaxy, all of which were successful. Collecting the statistics of other operators in India Dr. Keegan gives a total of 3,757 cases of stone, of these 94 were females and 88 were treated by litholapaxy, with a successful result in 87 cases. Dr. Keegan concludes that "the perfection of treatment for the vast majority of calculi is unquestionably litholapaxy." Keegan used the same instruments in girls and women as in boys and men and found them very satisfactory.

THE GIANT LITHOTRITE.

WHEN stationed at Gujrat Captain H. Smith, I.M.S., now Civil Surgeon of Jullundar, devised a "giant" lithotrite which was described by Dr. Keegan in an article in the *Lancet* (January 30th, 1897). Some defects in this instrument, were remedied in an improved pattern, which is shown on p. 28 of *Lancet* for July 3rd, 1897. In describing this giant lithotrite Dr. Keegan pointed out that suprapubic lithotomy was not fulfilling the hopes which had attended its revival, and that for very large calculi there was a growing consensus of opinion among surgeons in India, that perineal lithotrity, whether median or lateral, will supersede suprapubic lithotomy in dealing with these very large stones. The dimensions of the "giant" when closed are, size all over 18 in., size of blades 11 in., size of hollow handle 5 in., size of stem No. 20, size of stem at angle No. 25½, size of point No. 16. It will readily break up a hard calculus weighing 6 to 8 ounces. (See p. 313, *supra*.)

COMPARATIVE STATISTICS OF HOSPITALS IN PUNJAB AND NORTH WEST PROVINCES.

Up to Dec. 1895.

Nature of operation.	No. of operations.	Cured.	Died.	Percentage mortality.
Litholapaxy	10,073	9,665	399	3·96
Lateral lithotomy	7,201	6,407	794	11·02
Suprapubic "	147	89	61	42·17

KEEGAN, *Lancet*, 30th Jan., 1897.

THREE YEARS' STONE OPERATIONS IN THE PUNJAB.

The following table is taken from the Annual Report on Punjab Hospitals for 1898:—

Year.	By cutting.					By crushing.		Percentage mortality.			
	Suprapubic.	Lat. perineal.	Med. perineal.	Vaginal.	Dilatation (females).	Total.	Lithotripsy.	Litholapaxy.	Lithotomy.	Litholapaxy.	
1896	11	327	9	8	15	370	3	1,665	10.2	4.0	
1897	9	249	12	11	8	289	1	1,521	12.0	3.3	
1898	6	265	16	7	12	306	2	1,694	11.4	3.4	

(See *Indian Medical Gazette*, November 1899, p. 424.)

HINTS TO BEGINNERS.

The following note is extracted from Major J. A. Cunningham's article in the *British Medical Journal* (August 7th, 1887), it should prove useful to those commencing the operation of litholapaxy:—

"A stone having been detected in the bladder it is wise to subject the patient to a few days' preparatory treatment, with rest in bed to allay bladder irritability. The bowels should be unloaded by a purgative, followed by an enema on the morning of operation. If diarrhoea exists it may be necessary to give astringents. All lowering treatment should be avoided, as the patient's vital powers, doubtless already low, will be subjected to considerable strain during prolonged anaesthesia.

The temperature of the operating room should be regulated, and as little of the patient's body as possible should be exposed; a pair of long warm woollen stockings reaching well up on the thighs should be worn. The anaesthetic which I generally use is chloroform till the patient goes under, and then A.C.E. mixture to maintain anaesthesia. A narrow operating table, not too high is most convenient, and there should be a flat cushion placed beneath the buttocks. The instruments, placed on a flat dish, should be covered with a layer of hot carbolic lotion, and placed on a small table to the right of the patient near the operator's hand; a pot of oil should be at hand to lubricate instruments. It is well to draw off any urine that may be in the bladder, and to introduce a few ounces of warm boracic lotion. In a large number of cases it will be found necessary to slit up the meatus to admit the largest instruments the urethra is capable of accommodating.

It is needful to have an assistant who understands emptying and refilling the aspirator, for which warm water or boracic lotion should be used. Care should be taken not to begin crushing until the patient is quite under the influence of the anaesthetic or while there is any straining.

To avoid injury to the bladder great care is necessary during the application of the requisite force during the crushing process. This force in the case of a hard stone will sometimes be very great. Having caught the stone and locked the blades, the left hand, which holds the lithotrite, should be so placed as to keep the blades in the centre of the bladder, and to maintain them there the fixed elbow-joint should be pressed against the operator's side. During the application of force by the

right hand the attention must never be removed from the left hand and the position of the blades of the lithotrite.

In picking up fragments of stone care must be taken not to grip portions of the bladder. If in any doubt on this point the operator can satisfy himself by rotating or drawing forward the lithotrite before locking it.

Until some experience in the use of the lithotrite is acquired it is no easy matter, even in a simple uncomplicated case, to crush a stone in a reasonable space of time without inflicting injury on the bladder, and for a beginner to be confronted with a difficult case, such as an irritable or sacculated bladder, a large prostate, a partially-encysted or a very large stone, is enough to make him wish that he had never seen a lithotrite. On the other hand, with experience it is wonderful with what facility and rapidity even a large stone can be crushed.

It is well to crush as much of the stone as possible before withdrawing the lithotrite so as to have as few reintroductions as possible, and it is desirable to proceed with the various steps of the operation as expeditiously as possible, so as to minimise the time under the anaesthetic.

In cases with large prostate, or an irritable urethra or bladder, a considerable amount of blood may be lost, but in simple cases there should be no bleeding.

In using the aspirator great force should be avoided, especially in children. The amount of fluid that should be thrown into the bladder at each compression will vary with every case, and no rule can be fixed. Beginners will usually be puzzled to know when the last pieces are evacuated, but to an experienced operator the sound and feel of the fluid as it flows through the tube tell him whether evacuation is complete.

There is no operation in the whole range of surgery more perfect or beautiful in conception and application than litholapaxy, and none requiring a higher degree of skill, dexterity, judgment, and patience for its successful performance. A beginner should not attempt to operate in a complicated or difficult case, and if possible should always have an experienced operator beside him to advise and, if needful, assist him.

RECORD SIZED STONES.

We have been able to collect a few records of gigantic stones which have formed in the bladder. The largest which we have got accurate details about is one removed by Lieutenant-Colonel E. J. Bamber, I.M.S., when Civil Surgeon of Gujrat, in 1893. It weighed on removal 25 ounces, it is now 23 ounces and is still in the possession of Lieutenant-Colonel Bamber. It filled the bladder almost exactly and had to be removed by a suprapubic operation. The patient was a very old man, who stated that he had first felt the pain fifteen years before. He rallied well from the operation, and had a good pulse and was taking milk with relish, but two days after the operation he was found dead in his bed, the attendant had left him, and he died probably of syncope, for no signs of peritonitis were found *post-mortem*. Another equally enormous stone is referred to by Captain E. Jennings, I.M.S., in an article (*Indian Medical Gazette*, April 1895, p. 134); it weighed 25 ounces also when removed, and 22 ounces at time of writing. It was removed by suprapubic operation and the patient died. This stone had the following

measurements— $3\frac{1}{4}$ inches shortest diameter, $4\frac{3}{8}$ inches longest diameter, smallest circumference $10\frac{1}{2}$ inches, largest $11\frac{1}{2}$ inches.* Captain Jennings found this stone in the hospital at Rangpur; the name of the operator is not known to us.

In the *Indian Medical Gazette* for February 1892 (p. 44) there is an account of the successful removal of an enormous stone by Assistant-Surgeon Nitto Gopal Mittra, of the Arrah hospital. The patient was a Hindu, aged 40, and had suffered from stone "from boyhood." The usual lateral lithotomy was attempted, but on the size of the stone becoming known a suprapubic operation was done, necessitating an opening in the bladder from fundus to near its neck. The patient made an excellent recovery and left hospital after one month perfectly cured. The weight of the stone was $1\frac{1}{2}$ lbs., that is 24 ounces. It was roundish in outline, its circumference in one direction was $11\frac{1}{2}$ inches, and in another $9\frac{1}{2}$. This was certainly a first class operation and reflected much credit on Babu Nitto Gopal Mittra. Lieutenant-Colonel Bamber informs us that in 1864 Dr. Oldham removed a calculus weighing 20 ounces at Gujrat hospital, but the patient died of shock immediately after the operation.

In Holmes' *System of Surgery* (Vol. IV, p. 1015) the largest on record calculus is stated on the authority of Coulson to have been 6lbs. 3oz. (i.e., 99oz.), but in the same chapter, giving a list of operations performed at the Norwich hospital, the largest stone there recorded is only 4oz. 5 drs.

KEITH'S PERINEAL LITHOLAPAXY AT HYDERABAD (SINDH).

In a criticism of Mr. H. Milton's articles on lithotripsy Major Richard Baker, I.M.S. (*Lancet*, June 27th, 1896, p. 1822), gives a short table showing the results of the last five years of (1) urethral litholapaxy, and (2) of Keith's operation at Hyderabad (Sindh).

TABLE.

Urethral litholapaxy.	Cases.	Deaths.	Perineal litholapaxy (Keith's.)	Cases.	Deaths.
1891	221	8	1891	79	2
1892	328	5	1892	45	1
1893	555	4	1893	46	0
1894	313	3	1894	56	2
1895	337	3	1895	26	0
Total ...	1,754	23	Total ...	253	5
Mortality 1·31 per cent.			Mortality 1·91 per cent.		

These figures are, as Major Baker says, truly "phenomenal," and establish for ever the value

* This stone is now in the Museum of the Royal College of Surgeons, London.

of Keith's operation in the cases for which he advocated it (see below Hyderabad operations for fifteen years, p. 335).

A FEW APHORISMS FOR LITHOLAPAXY.

CAPTAIN G. T. Birdwood, I.M.S., has sent us the following:—

1. Very small calculi may give rise to the most painful symptoms, but the difficulties and dangers of litholapaxy vary directly with the size of the stone.
2. Few patients are too old or feeble for litholapaxy.
3. No operation should be carried on with a tight-fitting instrument.
4. The first two inches of a child's urethra are the narrowest, but in an adult obstruction to the lithotrite is met with at the triangular ligament.
5. Hypertrophy of the prostate occurs early in natives.
6. The irritation of a stone causes a slightly enlarged prostate to become a perceptible obstruction.
7. The long axis of a stone generally lies in the anterior posterior diameter of the bladder.
8. Where one fragment is found, there probably another one may be picked up.
9. The position of a refractory fragment may be altered (1) by raising the buttocks, (2) by displacing with the finger in the rectum.
10. As many fragments as possible should be crushed at the first introduction of the lithotrite.
11. Work should be stopped during a spasm of the bladder.
12. Serious injury may be done by withdrawing the canula without replacing the stylet.

REPLIES TO THE CIRCULAR ON STONE.

IN order to obtain the opinions and views of medical officers on various points connected with calculus disease and the operations for its removal we sent out a number of circulars, to which medical officers promptly replied. We here give a synopsis of the most interesting points mentioned in the various replies.

MAJOR J. A. CUNNINGHAM, I. M. S., of Delhi, states that one-third of the stone cases operated on in Delhi came from other districts. There is an average of about 46 stone cases in the year, 56 in 1899. In five years there were 216 litholapaxies with five deaths (one from chloroform) and 14 lithotomies with no deaths.

Litholapaxy is used in all uncomplicated cases, and for all ages. Lithotomy is reserved for very irritable bladder cases, or cases with perineal fistula or stricture of urethra.

The following lithotrites belong to the hospital; one, No. 5; two, No. 6; one, No. 8; one, No. 10; two, No. 16; and one giant lithotrite, modified by Major Cunningham, I.M.S.

In Mooltan MAJOR D. M. DAVIDSON, I.M.S., tells us that many cases come from neighbouring districts. The average number of operations yearly is 232. Litholapaxy is his usual operation, both in adults and boys. He has not done a suprapubic operation for several years past. The following instruments are in use: A, one; B, two; C, one; No. 16, four; No. 12, one; No. 10, one; No. 8, three; No. 6, one; No. 5, two; and one giant lithotrite. Major Davidson believes that patients nowadays come earlier for treatment, owing to the popularity of the crushing operation. Many patients who come have been treated by *hakims* for gonorrhœa (!) for long periods. Urates and oxalates are most common, phosphatic calculi are rare in Mooltan.

CAPTAIN H. SMITH, I.M.S., of Jullundar, writes that the average number of cases operated on yearly has been 119, but the numbers are increasing. His usual operation is litholapaxy; in case of very large calculi he uses perineal lithotripsy with a No. 26 (giant) in the adult, and a Weiss B, in the child. The hospital has all sizes lithotrites from Nos. 5 to 26 (Weiss).

MAJOR J. K. CLOSE, I.M.S., writes from Moradabad, that the district is a "stone" one; 65 operations per year is the average. His usual operation is litholapaxy, for adults and children. Sixty perineal lithotrities have been done within the past five years and only one suprapubic. The hospital has seven lithotrites, including Nos. A, B, C, and No. 5.

CAPTAIN G. BIRDWOOD, I.M.S., states that stone is not common in Ghazipur District (N.-W. P.), about a dozen cases every year. Lithotrites were only obtained for the hospital in 1896 (four in all). Captain Birdwood believes that one of the chief factors in causing the precipitation of uric acid is poverty of salts in the staple food of the inhabitants of N.-W. Provinces and the Punjab.

MAJOR R. S. MARKS, I. M. S., writes that Etawah (N.-W. P.) is not a stone district—one, two or three cases a year. The hospital has five lithotrites—No. 12, two; No. 10, two; and No. 7, one; the latter is found to be too large for children.

From Shahjahanpur MAJOR J. MORWOOD, I.M.S., writes that they get about 25 cases a year; litholapaxy is the operation he prefers, wherever possible. The hospital has four lithotrites, Nos. 12, 10, 8, 6.

MAJOR W. H. WOODWRIGHT, I.M.S., writes that at Bahraich they have on the average 14 operations a year, or 72 in the past five years, with three deaths. His usual operation is lateral lithotomy, as the hospital possesses no lithotrites.

MAJOR G. F. BAKER, I.M.S., writes from Gorakhpur, N.-W. P., that they get about 38 stone cases yearly. They had 191 operations with 13 deaths in the past five years. Major

G. F. Baker states that lateral lithotomy is at present his usual operation; and invariably so in children. The hospital possesses a good stock of lithotrites, Nos. 6, 8, 10, 12, 14, 15, 17, but Major Baker gives his reasons for preferring lateral lithotomy. He admits that statistics are overwhelmingly in favour of litholapaxy, but he maintains that they are fallacious, inasmuch as they are compiled from hospital statistics and do not deal with the after-history of patients. He is of opinion that could a record be periodically obtained of the after state of all cases, a good deal of the glamour which surrounds litholapaxy would be dispelled. He states that it is the experience of all operating surgeons that recurrences are frequent, and he says it is difficult to imagine such complete removal of debris by washing, from a fasciculated, thickened not to say sacculated bladder, that not a particle is left behind to become the nucleus of a fresh formation. He believes that in skilled hands the cutting operation with digital exploration of the bladder yields results at the time eminently satisfactory and remotely impossible to surpass. In his last 37 cases Major G. Baker had only one death, in an old man, where the urethra was absolutely blocked by multiple calculi; 16 stones of all sizes were removed.

Rai Bareilly is not a stone district; only about ten cases come in in the year.

DR. E. J. SIMPSON'S usual operation is lateral lithotomy, though the hospital possesses six lithotrites—9, 10, for boys, and Nos. 10, 12, 14, 15 for adults.

MAJOR D. W. SCOTLAND, I.M.S., states that on the average they have 29 operations in the year at Bulandshahr (N.-W. P.), or 148 cases with ten deaths in the past five years. His usual operation is lithotomy, "*from necessity rather than choice*," as most of the hospitals he has been in charge of did not possess the necessary instruments. He had one suprapubic operation, for a nine-ounce stone. He complains of the lack of instruments (lithotrites) in many hospitals, but having had such excellent results with the cutting operation he doubts if he would abandon it even in favour of litholapaxy; he also comments upon the certainty of having removed the whole stone in the cutting operations.

CAPTAIN J. M. CRAWFORD, I.M.S., states that at Muttra they get about a dozen stones per annum. There have been 56 operations in the past five years with seven deaths, i.e., 12.5 per cent. He uses lithotomy "*owing to want of lithotrites*." The three lithotrites in the Muttra Hospital are antiquated and all have not got evacuating catheters.

LIEUTENANT-COLONEL PAT. A. WEIR, I.M.S., Agency Surgeon, Baghelkhand, C.I., states that they get on the average about twenty-four cases in the year, but the numbers are increasing.

Litholapaxy is his usual operation, where favourable, but he avoids it if the patient takes chloroform badly and is a bad subject for prolonged anæsthesia. He prefers, as a rule, perineal lithotripsy to the suprapubic operation, but prefers suprapubic to vaginal lithotomy in females. The Head-quarters Hospital has the following instruments—

Thompson's Fenestrated (Downes' No. 2,619), sizes 14 & 16
 " Children's (Downes' No. 2,622), sizes 5, 6, 7, & 8
 " Flat, wedged-shaped No. 2,620), 6, 7 & 8, one each

CAPTAIN R. H. MADDOX, I.M.S., gives details of the operations done in Saran District (Bihar). In five years 68 cases have been done, with five deaths (7·3 per cent.). They were as follows:—Litholapaxies, 12; lateral lithotomy, 53, suprapubic, 2; and vaginal, 1. The 12 litholapaxies were done by Major T. Macdonald, I.M.S., with his own instruments. The lithotrites are old and useless, Nos. 6, 8, 10 and 12. Of the above 12 litholapaxies eight were in boys under twelve years and four in adults. There was one death in the 12 litholapaxies. Of the lithotomies 41 were in boys under twelve and the rest in adults; there were three deaths (all in children). The two suprapubic operations were as follows:—in a child, aged ten,—the stone weighed 1,260 grains; the other in an adult, the stone weighed 2,417 grains; both were successful. The vaginal case was performed in an adult female; it was also successful. In the Chupra Hospital cases the stay in hospital averaged 19 days; the shortest stay was 7 days, after litholapaxy, and 13 days in the lithotomy cases. The suprapubic adult case stayed 110 days in hospital.

CAPTAIN J. T. CALVERT, I.M.S., gives the figures for stone operations in the Durbunga Hospital, under various Civil Surgeons. About 13 cases a year are operated on, in the past five years there have been 61 cases of lithotomy with five deaths, and four cases of litholapaxy with one death. There are no instruments for doing litholapaxy in children, but two children's lithotrites have recently been provided in the Municipal Hospital. The Durbunga Raj Hospital has no lithotrites, and there are no funds in the Municipal Hospital to provide any more.

MAJOR J. H. T. WALSH, I.M.S., writes that stone is very rare in the Murshidabad District. He prefers litholapaxy for all class of cases except with very large or hard stones and where the bladder wants drainage owing to cystitis. The Hospital has the following lithotrites: Nos. 5 (child), 7, 9, 11. MAJOR WALSH thinks fenestrated lithotrites are a mistake. In the district there were 27 operations in five years with two deaths.

MAJOR C. E. SUNDER, I.M.S., states that there has been 26 operations on the average for the past five years in Gaya; 105 of these were litholapaxies, and 25 lithotomies. He always uses litholapaxy for choice. The hos-

pital is well provided, having Weiss' Nos. 5, 6, 7, 8, 10, 12, 14, 16, Bigelow's pattern, and 5, 7, and 10 of Thompson's. The vast majority of cases are in children. The climatic conditions of Gaya, MAJOR SUNDER notes, are approximate to those of the Punjab, but wheat is not eaten to the same extent; the water is very hard. Where necessary, the children's urethras are dilated with Liston's sounds to facilitate the passage of the canulas.

In the Central Provinces CAPTAIN STUART DALLAS writes that he has never met a case of stone in Chanda District.

DR. RAI FATEH CHAND BAHADUR, of Ludhiana, states that cases usually come to his hospital from the district; they are chiefly men of the lower castes—sweepers and *chamars*. On the average, the Ludhiana Hospital has about 21 operations for stone in the year. Out of 104 operations only two died. Litholapaxy is his usual operation, both for adults and for boys. The hospital is well provided with lithotrites, having Nos. 5, 6, 7, 8, 9, 10, 12, 14 and 16. Children are the most frequent patients.

LIEUTENANT-COLONEL J. McCLOUGHRY, I.M.S.,* the Civil Surgeon of Karachi, states that Karachi cannot be considered a stone district; the patients chiefly come from the neighbouring Makrana coast. About 19 operations for stone are done in the year. In the last five years 76 litholapaxies were done with three deaths, and 19 lithotomies with one death. His usual operation is litholapaxy, or for very large calculi perineal lithotripsy. Lieutenant-Col. McCloghry notes that the success of litholapaxies depends considerably on the complete evacuation of the bladder, and in order to ensure this, he invariably before sending the patient off the table, makes a careful examination per rectum while sounding.

CAPTAIN W. E. A. ARMSTRONG, I.M.S., Civil Surgeon of Quetta, states that 20 or more stone cases are operated on every year. In the past five years there were operated on in the Quetta Civil Hospital 98 cases—27 were by lithotomy and 70 by litholapaxy. Out of these 98, there were four deaths, one lithotomy and two litholapaxy; the fourth death was a very large stone, 16 oz., which was commenced by litholapaxy and finished by lateral lithotomy. The Quetta Hospital has the following lithotrites: Nos. 6, 12, 14, 15 and 17.

In Kheri District, N.-W. Provinces, DR. MCCALL states that they have had 58 operations with three deaths in the past five years. His usual operation is litholapaxy. The hospital possesses Nos. 5, 8, 9, 10, and B and C lithotrites.

* Lt.-Col. McCloghry sends us a photograph of an old Biluchi on whom he recently did a litholapaxy and removed a stone over 2 oz. in weight. This man must be at least 80 years of age, as he says he had a beard four inches long at the time of the conquest of Sindh.—ED., I. M. G.

MAJOR J. R. ADIE, I.M.S., writes from Ferozepore (Punjab) that about 80 cases yearly are operated on—428 cases with 23 deaths in five years. His usual operation is litholapaxy. The hospital has the following lithotrites with canulas to match—Nos. 4½, 6, 8, 12, 14, 15 (Weiss). Major Adie remarks that the crushing operation is now so well known to the peasantry that they ask for it when they come to hospital.

LIEUTENANT-COLONEL J. R. POYNDR, I.M.S., Civil Surgeon of Raipur, C.P., states that they have on average 33 cases of stone a year. In the last five years there have been 28 lithotomies, and 152 litholapaxies, with three deaths—one lithotomy and two litholapaxy. In case of very large calculi Lieutenant-Colonel Poynder prefers the suprapubic operation on account of its greater rapidity—an important matter in weak old men, who take chloroform badly. The hospital at Raipur has thirteen lithotrites, *viz.*, Weiss' A, B, C, No. 8, two; No. 6, two; No. 5, one; No. 14, one; No. 10, one; and Evan's and Wornall's Nos. 7, 8 and 10. Evan's instruments open further on the screw and thus grasp a bigger stone. Lieutenant-Colonel Poynder mentions a useful manœuvre where the stone is so large that the blades will not lock, *viz.*, to tap the female blade sharply with a mallet. He also notes the intense pain caused by a stone caught in the neck of the bladder, and the peculiar way the stone becomes moulded to the shape of the urethra. This stone can often be gently forced back into the bladder and then treated in the usual manner.

As showing the comparative rarity of stone in Bengal, MAJOR HAROLD BROWN, I.M.S., informs us that only eight cases were operated on in the Alipur Hospital in the past five years. In other districts Major Brown usually prefers litholapaxy.

In Mozufferpore (Bihar) MAJOR C. R. M. GREEN, I.M.S., informs us that only nine operations, all successful, were done in the past five years. He had a successful suprapubic operation in an old emaciated man, with a large urinary fistula, from whom he removed three large stones. He has done ten lithotrities without a death; the largest stone weighed 1,400 grains. Stone is not common in Mozufferpur, though cataract and goitre are so. The soil is alluvial and saliferous, chiefly sulphate of soda, carbonate of lime and nitrate of potash.

LIEUTENANT-COLONEL M. D. MORIARTY, I. M. S.,* writes from Meerut that they get about 50 stones a year, 16 per cent. of which come from other districts. In the past five years they have done 247 operations with 18 deaths. He prefers litholapaxy almost invariably. Large stones, he

says, are rare, as since the introduction of litholapaxy patients do not delay to undergo this operation. The hospital has No. 5, No. 12, No. 17, and No. 8 lithotrites. In Colone, Moriarty's opinion recurrence is not more frequent after litholapaxy than after lithotomy, and even if it were, litholapaxy would be the preferable operation. He has had a series of 96 successful litholapaxies, but has never approached such a result with lithotomy. The worst complication of a stone case is dilated ureters and pyelitis. Peritonitis is best treated with sulphate of magnesia; under this treatment he had more than once seen a complete disappearance of the symptoms. A stone fixed about the membranous urethra is best got back into the bladder by passing a canula down on it and then injecting water. COLONEL MORIARTY has seldom failed in this manœuvre.

LIEUTENANT-COLONEL JULIAN C. SMITH, I.M.S., Civil Surgeon of Saharanpur, writes that they have on the average about 48 stone cases in a year, but the numbers are steadily increasing—241 cases with 12 deaths in the past five years. Litholapaxy is his usual operation, except in special cases. For large stones he prefers perineal lithotripsy. The hospital has a set of lithotrites from No. 5 to No. 16. All his recent fatal cases occurred in old debilitated men and women with advanced kidney and bladder disease, but with distressing symptoms which necessitated operation for relief.

MAJOR J. GARVIE, I.M.S., Civil Surgeon of Sitapur, Oudh, states that there were 48 stone operations in the past five years, nine litholapaxies with one death, and 39 lateral lithotomies with two deaths. The hospital has one No. 5 for children, and Nos. 12 and 14 lithotrites for adults only.

LIEUTENANT-COLONEL R. MACRAE, M.D., I.M.S., Civil Surgeon of Dacca, writes that Dacca is not a stone district, but patients come into the Mitford Hospital from all the neighbouring districts; about 25 stone cases in a year are operated on. In the past five years, there were 94 litholapaxies, three lithotomies, six external urethrotomies, 27 removals of urethral calculi, and one suprapubic lithotomy, *all successful*. Lieutenant-Colonel Macrae writes that stone is extremely rare among young children in Dacca, only two cases of boys in five years. He considers that there are very few cases in which lithotomy is necessary, and considering the unequalled success of litholapaxy, no other operation is justifiable, unless some very special reason exists, as want of instruments or an unusually large or hard stone. The Mitford Hospital is well equipped, having Weiss' Nos. 6 to 16. The most common variety of stone in Dacca is the mixed, next uric acid, and phosphatic calculi. Adults of all ages have been operated on with uniform success; on

* The exact figures for Meerut are lithotomy, 27 cases with 7 deaths, litholapaxy, 218 cases with 11 deaths. This shows how litholapaxy is the operation of election.—[ED., I.M.G.]

death for five years. Of the 94 litholapaxies, Lieutenant-Colonel Russell did 28; the late Major J. F. Evans, one; Major C. R. M. Green, four; and Lieutenant-Colonel Macrae, 61; all without a death. As Lieutenant-Colonel Macrae says, "in no other important operation in surgery of equal magnitude has such a large measure of success been obtained." Lieutenant-Colonel Macrae contrasts the rarity of stone in children in Dacca with its commonness in children in Gaya. In Gaya he found litholapaxy practicable in almost every case in a child, their urethras being of larger calibre than generally supposed.

LIEUTENANT-COLONEL FRENCH-MULLEN, I.M.S., Civil Surgeon of Patna, states that nine or ten operations on stone in the year are done in Bankipore Hospital. Out of the last 16 litholapaxies there were no deaths. There are now no suitable instruments for litholapaxy, No. 12 being the smallest. There was a successful suprapubic operation for a large stone recently in the Patna city dispensary. In Behea Dispensary there is an average of nine operations on stone in the year, or 47 operations with one death in five years; all were cut, as there are no lithotrites in the hospital. Assistant-Surgeon R. K. Gupta prefers *median* lithotomy. In the hospital at Barh there have been 14 operations of this nature in the past five years with one death. Lateral lithotomy is the operation done by the Civil Hospital Assistant in charge.

CAPTAIN J. W. GRANT, I.M.S., supplies the information from the Jodhpur (Rajputana) Hospital. About 53 cases of stone are operated on in the year, or in five years 150 lithotomies with seven deaths, and 116 litholapaxies with four deaths. Litholapaxy is now the operation of choice. The hospital has all sizes lithotrites from No. 6 to No. 18.

From Indore, a name always to be associated with litholapaxy in India, LIEUTENANT-COLONEL G. H. GIMLETTE, I.M.S., writes that they have had 306 litholapaxies with 13 deaths in the past five years, and only five lithotomies with three deaths. Litholapaxy is the usual operation for all ages. The hospital has 20 lithotrites of all sizes from Nos. 3½ to 19. Lieutenant-Colonel Gimlette writes: "*Since Keegan commenced operating on boys by litholapaxy in this hospital the mortality has only been 2·2 per cent.*"

CAPTAIN A. W. F. BUIST, I.M.S., Civil Surgeon of Amritsar, states that most of the patients come from outside the district. On the average 71 operations are done in the year; out of 333 litholapaxies the death-rate was 3·3 per cent.; there were only 22 lithotomies done in the same period. In a case lately Captain Buist had to do a lithotomy because the stone was so smooth that the lithotrite kept slipping off. The hospital has lithotrites from Nos. 4 to 11, and Weiss's A, B and C. Captain Buist points out that *celerity* in operation is an important

factor in success in weak and debilitated patients. He gives hypodermics of morphine and atropine to such cases, also strychnine. For very large stones he prefers crushing through a perineal wound, where the calculus is encysted *anteriorly*, he prefers the suprapubic operation, as it may have eroded the wall to such an extent that its removal leads to perforation, &c.

MAJOR H. W. STEVENSON, I.M.S., Civil Surgeon of Hyderabad, Sindh, submits the following table of stone operations performed in that hospital since 1885. The table shows clearly the decline and fall of lithotomy and the rise of litholapaxy. The operation success of urethral litholapaxy is truly marvellous, a death-rate of only 1·7 for over 3,000 operations. The death-rate for large stones operated on by Keith's operation is only 3·6 for the past nine years—records of which any operator or hospital may well be proud.

Table of stone operations at Hyderabad (Sindh) for past 15 years.

YEAR.	Litholapaxy.		Perineal Lithotrity, Keith's.		Lateral Lithotomy.		Suprapubic operation.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1885	...	...	...	...	181	14	...	...
1886	...	...	...	...	176	13	...	...
1887	...	...	...	...	175	6	...	...
1888	13	2	...	...	182	11	2	2
1889	16	2	...	...	194	16	1	1
1890	61	9	...	...	155	7	...	...
1891	221	8	77	2	15	5	...	...
1892	328	5	45	1	3	1	...	...
1893	555	4	46	...	...	...	...	...
1894	313	3	53	2	14	1	1	1
1895	337	3	26	...	16	1	1	...
1896	387	2	21	1	29	7	...	...
1897	260	1	17	1	3	1	...	...
1898	424	8	35	2	6	1	4	4
1899	266	9	29	4	8	3	1	1
TOTALS ...	3,181	56	345	13	1,157	87	10	9
	1·76 Percentage mortality.		3·67 Percentage mortality.		7·52 Percentage mortality.		90 Percentage mortality.	

LONDON LETTER.

THE SURGERY OF THE SOUTH AFRICAN WAR.

Two meetings of the Royal Medical and Chirurgical Society have recently been held, at which highly interesting and important addresses were given by Sir William MacCormac and Messrs. Frederick Treves and Clinton Dent on the results of their observations and experience at the seat of war. Weapons and wounds were fully and graphically described, and arrangements for relief and treatment carefully and critically detailed. Specimens were exhibited and lantern pictures displayed which added materially to the value and enjoyment of the dissertations. The room was crowded with fellows and visitors and both meetings were

an unqualified success. The journals have given full reports of these proceedings which I shall not, therefore, attempt to summarise; but there are two matters of special importance to which Mr. Treves directed pointed attention, which are deserving of particular notice. One is—

THE EVIL EFFECTS OF TRANSPORT.

The importance of rest in the treatment of injuries is supreme; and the difficulty of obtaining rest for the injured and wounded in war is undoubtedly the chief hindrance to success in military surgery. "In the present war," Mr. Treves remarked, "the worst element in the treatment of fractures was the long and difficult transport. Compound fractures did very well when retained in the field hospital for a time, and there was an immense advantage in having a large field hospital behind the fighting line." The question of transport was also shown to have a most critical relation to the issue and treatment of abdominal wounds. Director-General Jameson, in the remarks which he made following Mr. Treves address, seized upon the question of transport as one of cardinal importance and emphasised the necessity of a hospital immediately behind the field hospital. He showed, on the authority of Colonel Stevenson, how the long journey to the base hospital made all the difference in many cases between an aseptic and septic condition of wounds. Of course the movements of the sick must, under present conditions of warfare, depend largely on the events of the campaign; but in future negotiations regarding the location of the sick and wounded in the war, the necessity of avoiding removals and securing prolonged rest must constitute a subject of prominent consideration. The other matter to which I refer is—

THE TREATMENT OF PENETRATING ABDOMINAL WOUNDS.

There was a strong feeling among Surgeons, Civil and Military, before the commencement of the war that the operation of laparotomy would be largely required in the treatment of perforating wounds of the abdomen. Mr. Treves went out to South Africa prepared for this; but he has returned with the conviction that (1) the proportion of such cases which recovered without operation was very high—as high as 60 per cent; and (2) that the result of operative treatment of abdominal injuries in the field was most discouraging. Other reporters from the front

have arrived at the same conclusion, and as a result of his experience, Mr. Treves has laid down rules regarding circumstances indicating and contra-indicating operations which I may quote. "The conditions indicating operation are—(1) early treatment (within seven hours); (2) short and early transport; (3) wounded above umbilicus, antero-posterior with escape of bullet or extensive hæmorrhage; (4) some wounds of like nature below umbilicus. Those contra-indicating operations are,—(1) lapse of more than seven hours; (2) long and rough transport; (3) transverse and oblique wounds above umbilicus; (4) all cases of retained bullet; (5) wounds of liver and right kidney; (6) most wounds below umbilicus. In short, he observed that cases suitable for immediate operation were extremely few." The Chapter V in the text-book on the treatment of abdominal injuries will have to be rewritten when the war is over.

6th June 1900.

K. McL.

Notice.

SCIENTIFIC Articles and Notes of Interest to the Profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if requested.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., Calcutta.

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BOOKS, REPORTS, &c., RECEIVED.

Major Giles, I.M.S., *Handbook of Mosquitos*. Dr. Christy's *Mosquitos and Malaria*. Watson Cheyne's *Manual of Surgical Treatment*, Vol. III (Longman & Co.). T. T. A. B. C. The Bengal Jail Administration Report. T. T. A. B. C. The Assam Asylums' Report. T. T. A. B. C. Punjab Asylums' Report. The Bengal Asylums' Report. Walsham's, *Surgery*, 7th Edition.

COMMUNICATIONS RECEIVED FROM:—

Lieut.-Col. P. Durrell Pank, I.M.S., Jeypore; Lieut.-Col. W. H. Henderson, I.M.S., Bombay; Major Richard Baker, I.M.S., Bombay; Major J. A. Cunningham, I.M.S., Delhi; Major F. P. Maynard, I.M.S., London; Major A. H. Nott, I.M.S., Hazaribagh; Major D. M. Moir, I.M.S., Chittagong; Major Harold Brown, I.M.S., Alipore; Major C. R. M. Green, I.M.S., Mozufferpur; Capt. G. Lamb, I.M.S., Bombay; Capt. S. P. James, I.M.S., Quilon; Lieut.-Col. D. B. Spencer, I.M.S., Calcutta; Major Havelock Charles, I.M.S., Calcutta; Capt. R. Bird, I.M.S., Calcutta; Lieut.-Col. J. Anderson, I.M.S., Agra; Lieut.-Col. Moriarty, I.M.S., Meerut; Lieut.-Col. Julian Smith, I.M.S., Saharanpur; Major G. M. Giles, I.M.S., Naini Tal; Major D. M. Davidson, I.M.S., Mooltan; Dr. E. Neve, Kashmir; Capt. H. Smith, I.M.S., Jullundar; Capt. A. J. Macnab, I.M.S., Mardan; Capt. C. Berry, I.M.S., Rangoon; Capt. A. E. Grant, I.M.S., Madras; Lieut.-Col. W. K. Hatch, I.M.S., Bombay; Lieut.-Col. J. McCloghry, I.M.S., Karachi; Capt. Armstrong, I.M.S., Quetta; Capt. J. W. Grant, I.M.S., Jodhpur; Lieut.-Col. Perry, I.M.S., Lahore; Major Scotland, I.M.S., Bulandshahr; Major G. Baker, I.M.S., Gorakhpur; Capt. A. E. Bulst, I.M.S., Amritsar; Major Adie, I.M.S., Ferozepore; Major J. H. T. Walsh, I.M.S., Murshidabad; Capt. C. J. Fearnside, I.M.S., Rajahmundry; Capt. Calvert, I.M.S., Durbhunga; Capt. Maddox, I.M.S., Chapra; Major W. H. Woodwright, I.M.S., Bairach; Dr. Maberly, Cape Colony; Professor Adami, I.M.S., Simla; Major Reilly, I.M.S., Akola; The P. M. O., H. M.'s Forces, Sin; Davis, B.A.M.C., Simla; Lieut.-Col. Major A. M.

Original Articles.

THE OCCURRENCE OF MEDITERRANEAN OR MALTA FEVER IN BOMBAY.

BY GEORGE LAMB, M.B. (GLASG.),

CAPTAIN, I.M.S.

(From the Research Laboratory, Government House, Parel, Bombay.)

THAT Malta fever is not confined to the shores and islands of the Mediterranean is no new fact. Before the serum sedimentation reaction came to be applied to the diagnosis of this disease, Bruce and others had long surmised that the geographical distribution of Mediterranean fever was much wider than is indicated by its name. Cases which clinically resembled Malta fever have been for long described by observers in America under such names as typho-malarial fever, and malarial continued fever. And in India anomalous forms of continued fever, the clinical accounts of which are much like those of Mediterranean fever, are constantly met with and classified under the names of simple continued fever, low fever and non-malarial remittent fever. But so variable are the symptoms and so uncertain is the duration of Malta fever, that it is not to be wondered at that cases should escape recognition when the ordinary clinical methods of diagnosis are alone employed. It has even been stated by an excellent authority on Indian fevers that this disease has no congener in India.

The serum sedimentation reaction has rendered the diagnosis of Malta fever an easy and simple matter. Professor Wright,¹ of Netley, was the first to establish the fact that the serum of patients who are suffering from or who have recovered from Malta fever produces a specific agglutinating and sedimenting reaction on the micrococcus melitensis. This observation has been confirmed by others, especially by Aldridge² in Malta, and Elkington³ in Gibraltar. And since the date of Wright's original publication, Major Birt and myself⁴ have carefully investigated this reaction, and have established beyond a doubt that the serum reaction of Malta fever is one of the most delicate bacteriological tests with which we are acquainted, and ought undoubtedly to supersede the ordinary clinical methods of diagnosis, especially as it occurs comparatively early in the course of the disease. Further, by means of the serum sedimentation test, Bruce's surmise has been proved to be a

fact, viz., that Malta fever is not confined to the basin of the Mediterranean. Wright and Smith¹ were able to find in the Royal Victoria Hospital, Netley, ten cases invalided from India in which the specific serum reaction was well marked. And since the date of that publication ten other examples have been observed by Major Birt and myself² in the same hospital. It is worthy of remark that fourteen out of the total of twenty such cases came from a comparatively small station in the Punjab, viz., Meean Meer, while the others contracted the disease in Calcutta, Nowshera and Subathu. Lieutenant W. Glen Liston, I.M.S.,³ has found a well marked reaction in a case of simple continued fever contracted in Secunderabad in the Deccan.

In the editorial columns of the *Indian Medical Gazette* for July 1900, the case of a lady, who contracted the disease at Simla, is reported. The blood serum gave a well marked reaction with an emulsion of micrococcus melitensis sent out from this Laboratory. In the same paragraph mention is made of a second case, also in Simla, whose blood serum gave only a doubtful reaction. Since this publication I have had the opportunity of testing the blood of this latter case, with the result that a complete reaction was obtained with a serum dilution of 1 in 50 and a well marked reaction with a dilution of 1 in 100.

Out of India the following cases, the sera of which gave a good reaction with the micrococcus melitensis, have been put on record.

(1) Dr. Musser and Dr. Sailer⁴ report the case of an Army Officer who contracted the disease in Puerto Rico during the late Spanish-American War.

(2) Kretz⁵ records the case of a physician who contracted an obstinate fever of six months' duration in Ajaccio, Corsica. After recovery the blood serum in high dilution agglutinate the micrococcus melitensis.

(3) Along with Major Birt,⁶ I have recorded a case which evidently contracted the disease in Plymouth or London. A year and two months after convalescence the blood serum in 20-fold dilution completely sedimented the micrococcus melitensis.

(4) Brunner, of Trieste,⁷ reports the case of a workman who contracted Malta fever while employed in the construction of a railway in Southern Dalmatia. The illness lasted for nearly three months. Pure cultures of micrococcus melitensis were obtained by puncturing the spleen of the patient. The serum reaction was

¹ The *Lancet*, March 6th, 1897, page 656.

² The *Lancet*, May 21st, 1898, page 1,394. Report of the Health Department of Malta 1898.

³ Reports of the Sanitary Officer of Gibraltar, 1897-1898.

⁴ The *Lancet*, September 9th, 1898.

¹ *British Medical Journal*, April 10th, 1897.

² Loc. Cit.

³ The *Lancet*, September 9th, 1898.

⁴ Proceedings of the Pathological Society of Philadelphia, February 1st, 1899.

⁵ *Wiener Klinische Wochenschrift*, No. 49, 1897.

⁶ Loc. Cit.

⁷ *Wiener Klinische Wochenschrift*, February 15th, 1900.

also obtained in this case. These results were confirmed by Kretz, of Vienna, and Leishman, of Netley.

Since coming to Bombay some six months ago I have investigated this reaction in a number of cases of anomalous fever. It is the result of this investigation which I have now to put on record. All observations were made macroscopically by means of the sedimentation tubes devised by Professor Wright.¹ Carbolic emulsions of sterilised agar cultures of the micrococcus were employed in all cases. A detailed description of this technique will be found in a paper by Professor Wright published in the *British Medical Journal* of February 5th, 1898.

Seven cases of fever of an anomalous type occurring in Europeans were examined.

It may be stated that no malarial parasites were found in the blood of any of these seven cases, and that the serum reaction with bacillus typhosus gave in every instance a negative result.

The serum of the following three cases, detailed in chronological order, gave a definite positive reaction with the micrococcus melitensis.

Case 1.—G. C., European, aged 28. Patient had been resident in Bombay for a year and a half, and at no time had he lived in the Mediterranean Basin. He was admitted into St. George's Hospital on the 4th February 1900, suffering from fever of about seven or eight days' duration. From about a fortnight before his admission to hospital patient had complained of loss of appetite, lassitude and general malaise. Fever was present for about a week before admission, but no record of the temperature is available during this period. At the same time he suffered from severe headache, while his bowels were constipated, and sweating was profuse.

He left hospital on the 20th March before convalescence was established. During his residence the temperature was of an irregular type (*vide* Chart 1). The prominent symptoms were profuse sweating and severe constipation. The tongue was coated with a dirty white fur.

He came under my observation for the first time on the 14th March. The serum reaction with the micrococcus melitensis was tested on this date with the following result:—

DILUTIONS.

Date.	10	20	50	100	REMARKS.
14th March 1900.	Complete.	Complete.	Well-marked.	Trace.	No higher dilutions.

Case 2.—G. G. C., European, aged 36. Patient had been resident in Bombay for about four years. He was admitted into St. George's

Hospital on the 18th February 1900, suffering from fever, headache and lassitude.

For a month before his admission he had suffered from fever of a more or less continued type. No chart was kept during this period but he states that the temperature, as a rule, was, between 101° F. and 102° F., and that on some days it was higher. He suffered at the same time from severe pains in the bones and profuse sweating, especially at night, when the temperature was at all elevated. The bowels were constipated.

Patient remained under observation in hospital till the 18th March. During this residence the temperature was very irregular (*vide* Chart 2). The most prominent symptom was severe and profuse sweating. The bowels were constipated, and the tongue was covered with a dirty thick fur.

He proceeded to the convalescent home at Khandala on the 21st March before convalescence was thoroughly established. He remained there for three weeks, during which time he was free from all symptoms.

He returned to Bombay on the 11th April. Shortly after this he suffered from pain in the left ankle joint; this was soon followed by pain in both knees. No record of the temperature was taken during this attack; patient states, however, that he is sure fever was present. At the same time sweating returned. This relapse lasted for about a week or ten days. From the end of April up to the present (June 30th) patient has been quite free from fever or other symptoms.

The serum reaction with micrococcus melitensis investigated on four different occasions, gave the following results:—

DILUTIONS.

Date.	10	20	50	100	200	400	800	REMARKS.
2-3-00	Complete.	Complete.	Nearly Complete.	Nearly Complete.				No higher dilution.
7-3-00	Do.	Do.	Complete.	Complete.	Nearly Complete.	Trace.	Nil.	
14-3-00	Do.	Do.	Do.	Do.	Marked.	Nil.	Nil.	
23-4-00	Do.	Do.	Do.	Do.	Do.	Trace.	Nil.	

Case 3.—Mrs. P., European, aged 32. Patient arrived in Bombay from England on the 2nd December 1899. She had been resident in England since March 1899. Previous to this she had been in Bombay for three and a half years, during which period she had enjoyed good health.

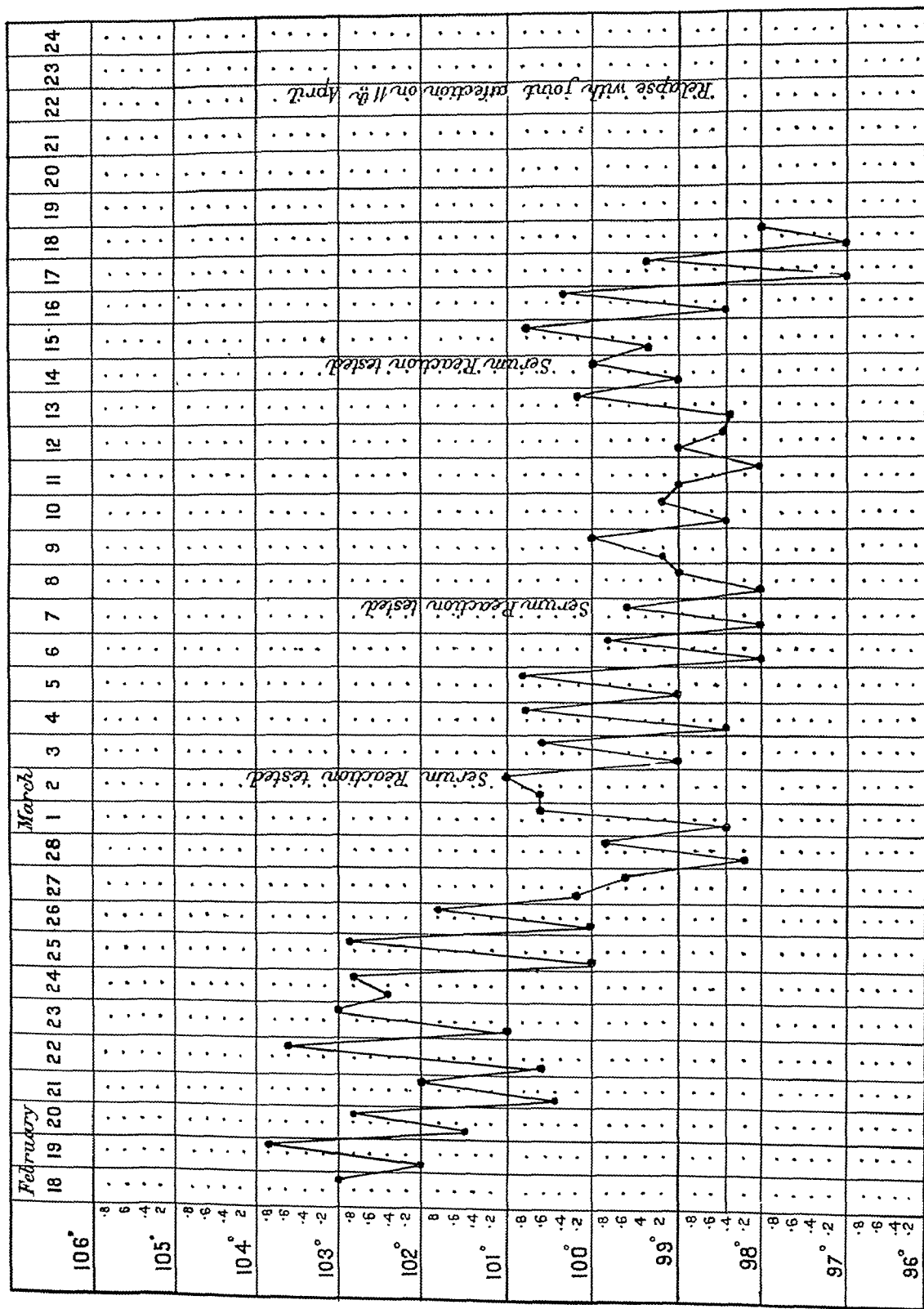
Patient first came under observation on the 11th April 1900. Although no complete record

THE OCCURRENCE OF MEDITERRANEAN OR MALTA FEVER IN BOMBAY.

BY CAPT. GEORGE LAMB, M.B., I.M.S.

CHART - 2. (G.G.C.)

Fever present for about a month before beginning of Chdrt.

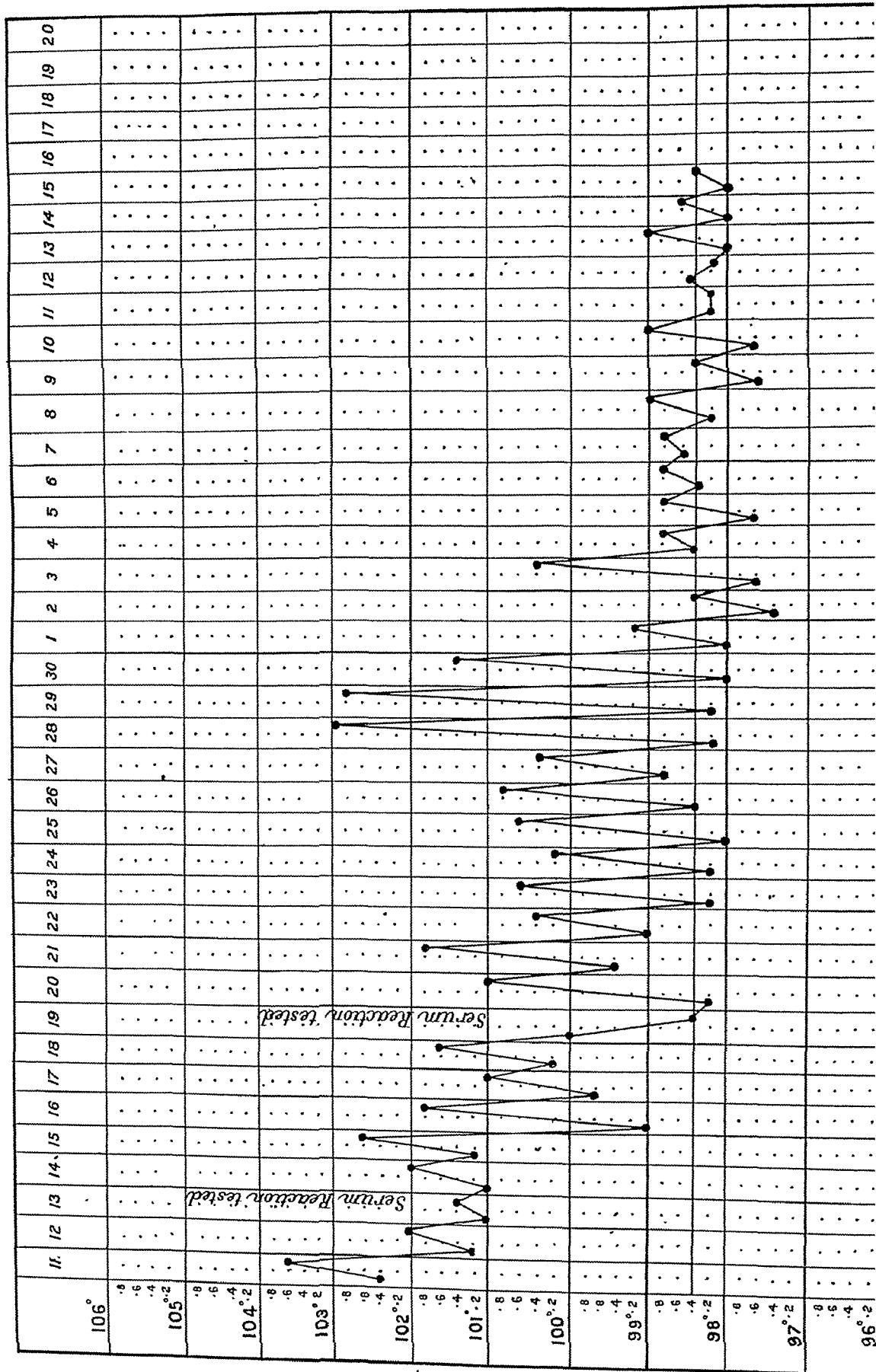


THE OCCURRENCE OF MEDITERRANEAN OR MALTA FEVER IN BOMBAY.

BY CAPT. GEORGE LAMB, M.B., I.M.S.

CHART - 3 (Mrs P.)

Fever began about a month previous to commencement of Chart.



of the temperature was kept previous to this, observations had been taken and are now available.

About the middle of March she began to complain of headache, lassitude and general malaise. The temperature first taken on the 19th March was 100°F. From this date till the 2nd April fever was practically continuous, the temperature ranging between 100°F. and 102.6°F. During this pyrexial period she suffered much from pain behind the eyes, headache and constipation. The tongue was covered with a dirty fur. Sweating was profuse.

The temperature fell to normal on the 2nd April and remained normal till 8th April. Between the 8th and 11th, on which latter day the chart begins, the temperature ranged between 101°F. and 103°F.

It will be seen from the chart (*vide* Chart 3) that fever of an irregular type continued till 14th May. On the 5th April she complained of pain behind the left knee-joint. About the same time swelling of the left femoral glands appeared. This was followed by a marked œdema of the left foot and leg. This enlargement of the glands resolved without suppuration and had completely disappeared by the end of May. On the 18th April pain in the right elbow joint set in. This lasted for a few days.

Sweating was profuse during the pyrexial periods, while there was a marked heavy smell noticeable on approaching the bed-side.

Slight swelling of the leg still persists, but otherwise she is quite well and gaining strength rapidly (June 28th.)

The serum reaction with the micrococcus melitensis was tested on two occasions with the following results:—

DILUTIONS.

Date.	10	20	50	100	200	400	REMARKS.
13-4-00	Complete.	Complete.	Complete.	Complete.	Well marked.	Nil.	

This record may be further extended by the following two cases which were both tested with bacterial emulsions sent out from this Laboratory. For the notes of Case No. 4 I am indebted to the kindness of Lieutenant-Colonel Dimmock, I.M.S., and for those of Case No. 5 to Dr. Kalapesi, Pathological Assistant, Grant Medical College.

Case 4.—K. C., female, Parsee, aged 17. Patient was admitted into the Petit Hospital on the 5th January 1900, suffering from fever. She had been confined about two and a half months previously. Since her confinement she had not enjoyed good health.

Fever began a short time before admission into hospital, and till she was removed from hospital on the 28th February 1900, was practi-

cally continuous, although of a very irregular type (*vide* Chart 4).

During the period she was under observation the chief symptoms were headache, sleeplessness and severe constipation.

On the 5th February she complained of pain in both knee-joints. This was followed on the 9th February by severe pain in both ankle joints.

Sweating was marked throughout. At no time were there any lung or heart complications.

On the 28th February, the serum reaction with micrococcus melitensis was tested by Dr. Kalapesi with the following result:—

DILUTIONS.

Date.	20	100	500	REMARKS
28th February 1900.	Complete	Complete.	Nil.	No other dilutions put up

The patient was removed by her friends on the 28th February before the temperature had come to normal.

Case 5.—Male, Japanese, aged 40. Patient had never been resident in Malta or elsewhere in the Mediterranean Basin. He was under observation altogether for a period of about eight weeks. During the first fortnight he suffered from fever of a continuous type, the temperature rising steadily and gradually to 102°F. This was followed by a week of complete apyrexia. During the last five weeks the temperature was more or less intermittent with a very irregular course and considerable diurnal variations. There were occasional rises as high as 102.2°F.

Profuse sweating, especially at nights, was a marked symptom.

There was no enlargement of liver or spleen. Heart, lungs and urine were all normal.

Large doses of quinine were given. These had not the slightest effect on the temperature or other symptoms.

The serum reaction with micrococcus melitensis gave the following results:—

DILUTIONS.

	20	100	500	REMARKS.
Agglutination (microscopically).	Complete.	Complete.	Complete.	No other dilutions.
Sedimentation (capillary tubes).	Do. ...	Do. ...	Well marked.	Tried.

A further investigation as to the occurrence of Malta fever among Natives of India in Bombay is being prosecuted, and will form the subject of another communication.

ON THE METAMORPHOSIS OF THE *FILARIA SANGUINIS HOMINIS* IN MOSQUITOES, ESPECIALLY WITH REFERENCE TO ITS METAMORPHOSIS IN THE *ANOPHELES ROSSII* AND OTHER MOSQUITOES OF THE *ANOPHELES* GENUS.*

By S. P. JAMES, M.B. (LOND.),

CAPTAIN, I.M.S.,

Quilon.

DR. PATRICK MANSON'S discovery of the metamorphosis which the *Filaria Sanguinis Hominis*,—the embryo of the *Filaria Bancrofti*,—undergoes in the bodies of certain mosquitoes has recently been confirmed by Dr. Bancroft in Australia; and I desire in this paper first to make some remarks regarding the time necessary for this metamorphosis in different mosquitoes; and afterwards to describe briefly the experiments which I have carried out on feeding mosquitoes on the blood of filariated persons, which prove that mosquitoes of the *Anopheles* genus are capable of acting as efficient intermediary hosts for this parasite.

Dr. Bancroft discovered that mosquitoes can be kept alive in confinement for many days by feeding them on bananas; and having thus overcome the chief difficulty that has, up till now, prevented the confirmation of Manson's discovery, he was able to prove that in a certain species of the *Culex* genus of mosquito (*Culex Ciliaris*, Linn.) the metamorphosis of the filaria required seventy to twenty days for its accomplishment.

The important difference between his results and those of Dr. Manson is, that whereas Manson stated that only seven days were required for the metamorphosis of the filaria in the mosquito, Bancroft found that in his mosquitoes more than double that time was necessary; and he comes to the conclusion, therefore, that Manson must have been in error in his estimate of seven days, and is of opinion that Manson's mosquitoes must have fed on the blood of a filariated man some weeks before he began his experiments with them. I do not think that this conclusion is justifiable. If it is correct, it means that Manson employed any mosquitoes, that came by chance into his filariated patient's room, and was not careful to ensure that they had not fed on an animal, or on man before they entered the room.

But Manson wrote distinctly as follows (Linnæan Society's Transactions, Series 2, Vol. II):—"In experimenting with the mosquito, there are two points I was careful in attending to,—I employed the proper species of insect, and I

took care that its *only* food was the blood of filariated man. Those who would repeat my experiments must bear these two points in mind." Thinking as I do that Manson would not have said this unless he was sure that the mosquitoes he employed had not fed at all previous to their meal on his filariated patient's blood, and because I have myself found that in the *Anopheles Rossii*, and in another species of the *Anopheles* genus of mosquito, only twelve to fourteen days are required for the same metamorphosis, I do not believe it impossible that there may be, in a place where "filariasis" abounds, a species of mosquito, in which, even in seven days, the metamorphosis can be effected.

It will be seen later in this paper (and it has been shown by other observers) that several different kinds of mosquitoes are probably efficient hosts for the filaria, but it is probable that these kinds are not all equally efficient—in some, the metamorphosis would take longer to be effected than in others. The most efficient kind would probably be found in a place where "filariasis" is exceedingly prevalent, for it is reasonable to suppose that the capacity for acting as an intermediary host for this parasite would increase, from generation to generation, in a favourable species of mosquito, in a place where these mosquitoes are always acting as intermediary hosts.

Thus it is likely that in the place where Dr. Manson carried out his experiments, the most favourable species of mosquito would be found. One does not know how common this parasite is in the place where Dr. Bancroft's experiments were made, but from his statement that he only knew of one person in whose blood filaria embryos were present, one judges that it cannot be very prevalent there. It would appear probable that if the "common house mosquito of Australia" were the *usual* intermediary host of this parasite, "filariasis" would be more prevalent there than it apparently is. One must remember too that climate and probably other factors have an important influence on the time taken by parasites to develop in their intermediary hosts, and it is possible that as some of Dr. Manson's mosquitoes were kept at a uniformly high temperature in an incubator (80 to 85° F.), they were more favourably placed in respect to climate at any rate than Dr. Bancroft's, for the latter states that when the weather was cold, as long a time as thirty-five days was required for the metamorphosis to be effected in some of his mosquitoes.

For the above reasons, therefore, I think that the time required for the metamorphosis of the *filaria nocturna* in the mosquito, cannot be stated definitely, and I consider that the "filaria-bearing" mosquito of Manson was a more favourable species than the *Culex Ciliaris*.

The following is an account of my experiments on feeding mosquitoes on filariated blood.

* This paper was read at the recent meeting of the British Medical Association.—ED., I. M. G.

ON THE METAMORPHOSIS OF THE FILARIA SANGUINIS HOMINIS IN MOSQUITOES, ESPECIALLY WITH REFERENCE TO ITS METAMORPHOSIS IN THE ANOPHELES ROSSII AND OTHER MOSQUITOES OF THE ANOPHELES GENUS.

By CAPTAIN, S. P. JAMES, M.D. (LOND.), I.M.S.

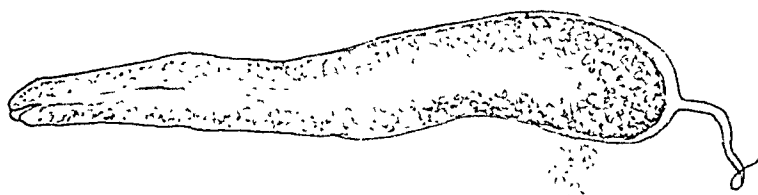


Fig. I.

From an *Anopheles Rossii* on 7th day after its first meal of filariated blood, showing especially a long curled "tail." Granular material is escaping, and the alimentary canal is partially formed.

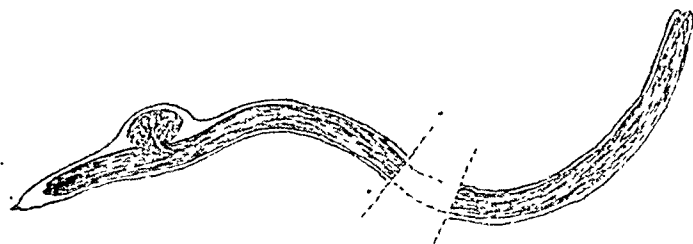


Fig. II.

From a nine-day mosquito (*A. Rossii*). Shows the "integument" completely encircling the filaria. A hernia from the anus has occurred and the integument or sheath covers this. The filaria had been immersed in water for a few minutes when this was drawn.



Fig. III.

Head end of same showing integument distended by endosmosis.

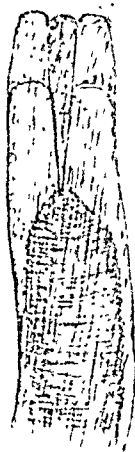


Fig. IV.

Head end of a nine-day filaria which has been some time immersed in water, and which has contracted within its integument or sheath. The filaria appears within this integument as if in a sac.



Fig. V.

Tail end of same filaria.

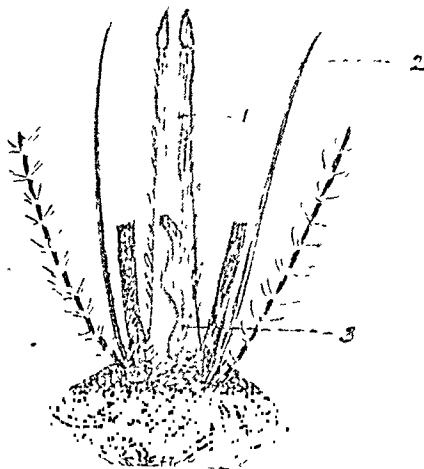


Fig. VII.

Head and proboscis of twelve-day mosquito. In the head and labrum of the proboscis a filaria is seen. This filaria indulged in sinuous undulatory movements until slight further dissection freed it entirely.

1. Labrum of proboscis.
2. Maxilla.
3. Filaria.

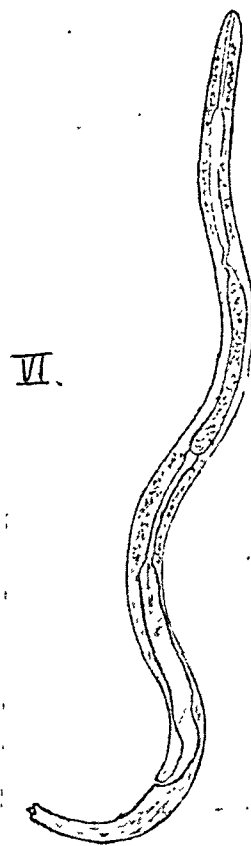


Fig. VI.

Shows the separate parts of the alimentary canal and the tripartite tail. The tail end does not taper sufficiently in the drawing.

All the experiments with *Culex* mosquitoes, and many of those with *Anopheles* mosquitoes were carried out before I was aware that Dr. Bancroft was also working at this subject.

The mosquito which Manson found to be an efficient intermediary host for the *filaria nocturna* belonged to the *Culex* genus, and for this reason I commenced my experiments last year on *Culex* mosquitoes.

At that time I employed the following method:—

A number of female *Culex* mosquitoes, bred from larvæ, were placed at night under the mosquito curtains of the bed of a man, in whose blood *filaria nocturna* embryos abounded. In the morning, those mosquitoes which had fed, were transferred to large glass bottles in which bananas were hung.

The bottles were kept in the open air under the shade of a tree, and each day the mosquitoes which died were examined in the manner recommended by Dr. Manson, and the progress of the development of the filariæ in them watched.

Probably, owing to my not renewing the bananas sufficiently frequently, none of the mosquitoes used in these experiments lived more than twelve days; and out of about 150 mosquitoes that I fed in batches on different nights for this series of experiments, only eight lived that length of time.

Among these eight, however, there were four mosquitoes in which the filariæ had arrived at an advanced stage of development. They measured from $\frac{1}{10}$ th to $\frac{1}{16}$ th of an inch in length, the alimentary canal was very distinct, and the head and anterior part of the bodies exhibited lively side to side movements, together with quivering movements of the whole body, and a constant flicking of the tail. Intermediate forms of the filariæ, between this and early stages of the parasite, were found in abundance in the mosquitoes, which died on earlier dates, so that, had these *Culex* mosquitoes lived some days longer, it is probable that they would have proved to be capable of acting as efficient hosts of the filarial parasite.

Major Giles, I.M.S., and Mr. Theobald, of the British Museum, have kindly identified these two species of *Culex* mosquitoes for me. They are:—

- (1) *Culex albopictus* (Skuse);
- (2) *Culex microannulatus*,

Culex albopictus is of especial interest in this connection; in that it is the species in which Lewis carried out his original observations on filarial metamorphosis.

These experiments, though satisfactory as far as they went, could not be said to have been quite successful, for the mosquitoes died before the final stage of the filariæ in them was reached, but they proved that in two species of *Culex*

mosquitoes, the *filaria nocturna* can live and develop to an advanced stage.

I was influenced, however, by Dr. Manson's statement that seven days only were required for the metamorphosis in the proper species of mosquito, and having noted that at Shertully in Travancore (where over 40% of the inhabitants are "filariated") mosquitoes of the *Anopheles* genus are quite as prevalent in houses as *Culex* mosquitoes, I now commenced feeding *Anopheles* mosquitoes on filariated blood. I found, however, that it was even more difficult to keep these mosquitoes alive in confinement than *Culex* mosquitoes. They do not readily feed on bananas, and it was not permissible to keep them alive by feeding them on animals or birds, lest some other parasite might be introduced as well as the particular filaria one wished to study.

After many trials I adopted the following plan, which also has the advantage that different stages of the parasite are present in the mosquito at the same time, and the connection between the stages is clearly seen.

A number of female *Anopheles* mosquitoes, bred from larvæ, were placed at night under the mosquito curtains of the filariated patient's bed. In the morning all that were full of blood, were transferred to bottles in which ripe bananas were hung. In the evening, they were replaced inside the curtains with the filariated man and the next morning collected again into the bottles. This practice was continued for the first five days and nights, so that each mosquito had at least four or five meals of filariated blood.

After the first five nights, the mosquitoes were taken to my bungalow where, for the next three or four nights, they were transferred under the mosquito curtains of my own bed, and so obtained meals of ordinary blood instead of filariated blood. In the daytime they were kept in the bottles with bananas. After the ninth or tenth day, they obtained no more meals of blood, but were kept in the bottles and fed on bananas only.

In this way, it was possible to keep them alive for at least fourteen or fifteen days, and many lived to the seventeenth and eighteenth days. Each morning the mosquitoes that died during the course of these experiments were examined by breaking up with needles, the thorax and abdomen on separate slides, in a weak saline solution, and examining with a two-thirds and one-sixth inch objective and low eye-piece without applying a cover-glass.

By this method, I have been able to trace the metamorphosis of the filaria to its final stage in the *Anopheles Rossii*, and in one other species of the *Anopheles* genus of mosquito, the name of which I have not yet ascertained.

Before I had read Dr. Bancroft's paper suggesting that the filariæ may be introduced into man

while the mosquito is in the act of biting, I constantly omitted (as I think previous observers had also done) to examine carefully the head and proboscis of my mosquitoes. In my last experiments, however, I was careful to do this, and as the examination of these parts of a filaria-carrying mosquito yields very important results from the point of view of filarial infection, it should never be omitted.

To obtain the final actively-moving stage of the filaria requires in the *Anopheles Rosii* from twelve to fourteen days; the filariæ which were present in seventeen and eighteen-day mosquitoes were not different in size or any other respect to those in thirteen-day mosquitoes.

The young filariæ are found in the tissues of the thorax, in those of the head and neck, and in fewer numbers in those of the abdomen.

The tissues of the head are examined by cutting through the neck with a sharp knife, and placing the head with the proboscis attached on a separate slide. By carefully dissecting up with needles the tissues of the head and separating the parts of the proboscis, several filariæ will almost invariably be found in this situation, and I have lately on two occasions found a filaria, lying stretched out lengthwise, partly within the tissues of the labrum of the proboscis, the remainder of its body being curled up in the tissues of the head. Without dissecting up the tissues of the labrum, these filariæ could be plainly seen with a $\frac{1}{4}$ inch objective through its fairly transparent tissues, indulging in sinuous undulatory movements; and a very little manipulation with the needles sufficed to free the filariæ, when their movements changed from the snake-like undulatory character to the vigorous, purposeless lashing and twisting, which are characteristic of the final stage in the mosquito (Fig. VII).

Once having seen these large and vigorous filariæ actively moving in this situation, one can scarcely fail to agree with Dr. Bancroft that "young filariæ may gain entrance to the human host, whilst mosquitoes bearing them are in the act of biting," and I take this opportunity of correcting the contrary opinion which I expressed in the *Indian Medical Gazette* for May 1900, which was written before I had begun to examine the heads and proboscis of my filaria-bearing mosquitoes.

The young filariæ in the final stage of their metamorphosis in the mosquito's body are from $\frac{1}{4}$ th to $\frac{1}{5}$ th of an inch in length and $\frac{1}{10}$ th of an inch in their greatest breadth, and they can be seen with the naked eye (or better with a small magnifying glass) as they twist and turn on the slide. They taper towards the head and towards the tail, and the latter is provided with three projections, which can be spread out or drawn closely together as the animal wriggles about. The head end is rounded, and the mouth, which is very extensive, can be pushed

out to form a little cone-like projection, which sways from side to side, and is drawn in and pushed out as if searching for food. The filariæ are provided with an alimentary canal, which at a somewhat earlier stage can be seen very freely movable within the animal's body and to be of varying shape in the different parts of the course (Fig. 6). Near the anus, it is wide, and then narrows quickly to open at a short distance from the tail. On each side of the alimentary canal, near the head, and again at a point about the middle of the body, the protoplasm is apparently differentiated into other organs (probably reproductive organs). In the tissues of the mosquito, the filariæ can, I believe, move about by boring their way from one place to another; for filariæ, which are almost completely imbedded in a piece of tissue, can be seen, on a slide, to gradually protrude themselves from it until they are quite free. In water, however, their powers of locomotion are very limited, but though the filaria does not alter its position on the slide to any great extent, it indulges in the most vigorous lashing and wriggling movements incessantly. If left in water on a slide, or in a watch glass, the movements gradually slow down, and in from two to three hours the filariæ die.

The following experiment, however, would appear to show that in serum or blood, they find a more congenial medium.

A mosquito (*Anopheles Rosii*), which had fed on filariated blood on May 11th, contained the final stage of the filariæ on May 24th. These filariæ were first examined in water, and after they had been on the slide for over an hour, their movements began to slow down. I succeeded in moving one to the other end of the slide without injuring it, and having pricked my finger, introduced the blood beneath the cover-glass, and surrounded it with vaseline to prevent coagulation. Its movements immediately became more active, and it tossed the corpuscles about in every direction. The filariæ, which were in water alone, died in two and a half hours, but this one continued vigorously active for over six hours. After this, it gradually slowed down and died in seven hours. This experiment, if it can be confirmed, will, I think, afford a strong proof that Bancroft's suggestion, that the filariæ pass directly from the mosquito to man, without first having to exist for some time in water, is correct.

My object in carrying out the experiments above described was not so much to study the minute changes which occur during the metamorphosis of the filaria, as to prove, by obtaining on repeated occasions the final stage of the parasite in *Anopheles* mosquitoes, that members of this genus of mosquito are capable of acting as efficient intermediary hosts, and I believe that, in Travancore, where "filariasis" is very common, the *Anopheles Rosii*, and at

least one other species of this genus, are the usual intermediary hosts of the *filaria nocturna*.

I have, however, copied from my notes a few diagrams which differ from, or are not figured in, Manson's original drawings. The notes attached to these, are, I hope, sufficiently explanatory.

I have not, as a rule, examined my mosquitoes at a sufficiently early stage, to form an opinion as to whether a "casting of the sheath" occurs, prior to the migration of the parasite to the tissues of the mosquito's body. A fine integument, continuous with the characteristic tail and completely encircling the body, is, however, visible from an early stage of the development of the parasite, after it has been immersed in water for a few minutes; and in later stages when distended by endosmosis, it forms a perfect sheath, encircling the animal.

Had Dr. Manson not stated definitely that a "casting of the sheath" occurred, one would certainly have considered that this integument was the original sheath (see Figs. II—V).

The escape of material from the anus is not due, in my opinion, to the pressure of the cover-glass as suggested by Bancroft. It occurred almost invariably in the "sausage" stages of my filariæ which were examined without applying a cover-glass.

I do not consider that the filariæ specially select the muscles of the thorax to migrate to. The fact that so many more are found, developing in the thoracic tissues, may be due to the ease with which they can pass from the crop,—which is a pouch of the œsophagus lying in the thorax and serving as a reservoir for food (Woldert, *Journal of American Medical Association*, February 10th, 1900), and from the œsophagus into the thoracic muscles before they are acted upon by the digestive juices. The majority of the filariæ which reach the stomach, are probably digested; a few, however, succeed in migrating into the abdominal tissues and undergo the metamorphosis there just as those in the thorax do.

NOTES ON BERI-BERI IN RANGOON.

By C. BARRY, M.B.,

CAPTAIN, I.M.S.,

General Hospital, Rangoon.

DURING the three years, dated from July 1896 to July 1899, all together 944 cases of Beri-Beri have been admitted into the Rangoon General Hospital for treatment. This period has been chosen partly to bring the results as far as possible up to date, and partly because during this period the hospital was for the first time under the supervision of a resident European commissioned medical officer, and in conse-

quence the diagnosis of cases has been more closely checked, and rendered more accurate than was previously possible.

It has been suggested that a large number of the cases, returned from this hospital as Beri-Beri, were in reality not suffering from this disease, but were cases of debility arising from various other causes such as syphilis, malaria, &c.

This suggestion I believe to be erroneous, though of course in dealing with a disease like Beri-Beri, the symptoms of which are so varied and the course of which is frequently so obscure, some errors in diagnosis may have undoubtedly crept in. The diagnosis of Beri-Beri I may mention has in no cases during the above-mentioned period been left to the unaided powers of an Hospital Assistant, but has always been verified and confirmed by the commissioned officer in charge of the ward into which the patient has been admitted.

The method by which the diagnosis has been arrived at has been that of noting the course of the disease together with that of excluding all other diseases which might give rise to symptoms of a similar nature.

In addition also a *post-mortem* examination has been made of a very large majority of those cases that have died, and in any case where a doubt has been thrown on the diagnosis by the discovery after death of any grave lesion of the internal organs, the previous diagnosis of Beri-Beri has been corrected, and death has been returned as due to the disease discovered *post-mortem*.

TABLE I.

Table showing the number of admissions into the Rangoon General Hospital for Beri-Beri from July 1896 to July 1899 and their division by caste:—

Year.	Total.	Died.	Males.	Females.	Hindu.	Mahomedans.	Burman.	Other classes.
1896-7	224	100	177	47	166	26	27	7
1897-8	364	178	327	37	319	27	11	5
1898-9	356	183	316	40	284	49	16	7
	944	461	820	124	769	102	54	19

Turning then to the figures obtainable from the hospital records during the abovementioned periods it is seen that 944 cases were admitted for treatment as in-patients, and out of this number no less than 461 died, the death-rate working out for males at 56.2 per cent., and for females at 36.2 per cent., and the total death-rate for males and females combined at 48.8 per cent. With regard to the further analysis of these figures it was found (see Table 2) that Beri-Beri was much more prevalent at one time of the year than at another. The number of admissions

varied greatly month by month, being comparatively few from March to August, increasing rapidly during August and September, to remain high during October, November and December, and again falling rapidly during January and February; as might be expected the mortality curve closely follow the admission curve.

Concerning the sex attacked it is seen that 820 males were affected against 124 females or roughly six males for every one female.

Regarding the occupation of the patients affected a list was made showing as accurately as possible the occupation of each of the 944 cases admitted, and it was found that where as amongst Burmans, Mahomedans and "other classes" the occupations were most varied; amongst Hindu the persons affected were nearly all working as coolies.

The following results are thus arrived at—

(1) Beri-Beri was more prevalent in Rangoon during certain months of the year than in others.

(2) The Hindus attacked belonged almost entirely to the coolie class.

(3) Hindus were attacked out of all proportion to other castes.

(4) Men were attacked much more frequently than women, and that the death-rate amongst the former was higher than amongst the latter.

Considering then the results arrived at if we consider Table 2, it is seen that neither the rainfall nor the temperature appear to have any influence on the incidence of the cases of Beri-Beri since cases occur with almost equal frequency in January, February, November and December, some of the driest months as in September and October two very wet months. Nor again can the temperature be supposed to have any influence since as many cases have occurred in October as in December, the former being one of the hottest and the latter one of the coldest months.

The curve of prevalence of Beri-Beri moreover does not coincide with that of the general death-rate of Rangoon, though the abovementioned disease has had such a heavy death-rate, for if we look at Table 3, showing the general death-rate of Rangoon for the period from July 1896 to July 1899, it is seen the death-rate of Rangoon maintains a fairly level curve rising to its highest point in February and March owing to the prevalence of small-pox during these months, whereas the curve showing the prevalence of Beri-Beri has a marked and definite rise yearly during the months of September, October, November, and December, and a fall during the months of January, February and March.

I think we may therefore exclude rainfall temperature or any general unhealthiness of any special period of the year from having any influence on Beri-Beri. Turning however to the fact that Hindus are attacked out of all proportion to other castes, it is found that these Hindus

come over mainly as coolies from Southern India at definite times of the year to work in connection with the paddy harvest, and if we look at Table 4 showing the number of immigrants in Burma for the period under consideration, *i.e.*, July 1896 to July 1899, the similarity between the curve showing the number of immigrations and that of the prevalence of Beri-Beri will be at once apparent. These immigrants therefore who are very largely composed of Hindus, begin to arrive in their largest numbers in September, the numbers rising during October to the highest point in November and then gradually declining to the lowest point in March; in other words their numbers rise and fall almost exactly as do the numbers of the cases of Beri-Beri.

The fact that the occupation of the patients attacked with Beri-Beri is in a very large proportion that of coolie bears out this view as also does the fact that Hindus were attacked out of all proportion to other castes. During the period under consideration 769 Hindus were attacked against 175 persons belonging to all other castes collectively (see Table 1), and this fact is all the more remarkable when it is noted that the average population in Rangoon for the same period was estimated at 67,000 Hindus against 140,000 Burmans, Mahomedans and other classes put together.

That women form such a small proportion of the patients attacked also bears out the view that the Hindu coolie is mainly responsible for the number of cases of Beri-Beri occurring in Burma, since by far the majority of immigrants into Burma, leave their wives and families behind.

As regards the habits of these coolies they come over in gangs to work on contract, some stay to work in the Rangoon mills, but the larger proportion go out into the outlying districts to reap the paddy harvest. As a rule it would appear they stay in Burma a variable time, but mostly about two years or perhaps longer. On going into the history of the patients admitted into hospital the general accounts obtained is much as follows: The patient came over from India to work as coolie for harvesting; on landing in Rangoon he was fit and well and went out into the jungle to reap. He kept his health for about nine months to one and half year and then began to suffer from fever. He never quite got over his attack, though the fever left him, and he gradually became weaker and weaker till he was quite unable to do any work, most frequently unable to walk or take any exercise.

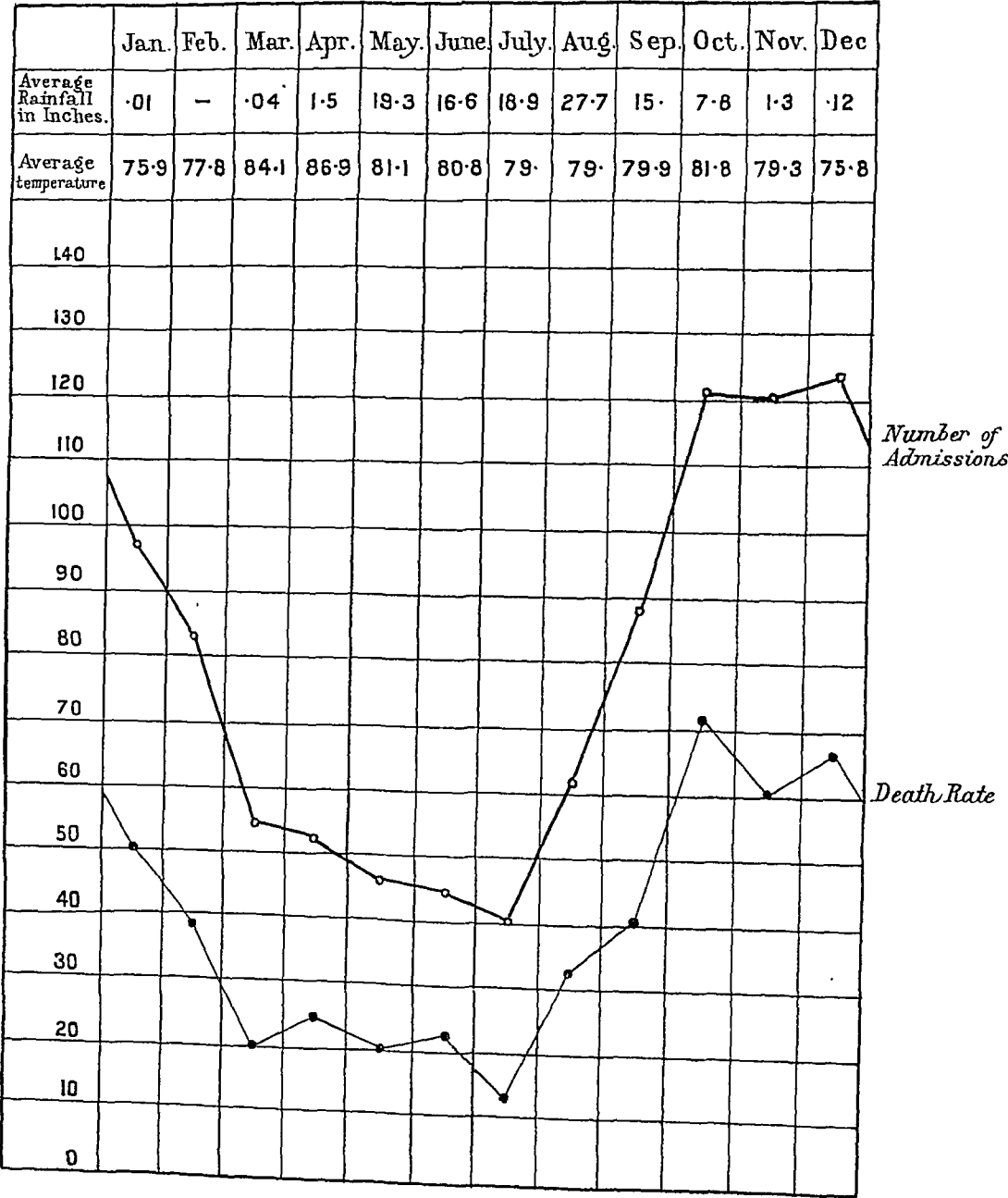
It is in this condition they return to Rangoon and seek admission into hospital. The time between the first onset of the attack of fever and the date of their coming to hospital is most frequently four to six months. On enquiry it is found that the patient has not suffered from privation and almost all state they have had

NOTES ON BERI-BERI IN RANGOON.

BY CAPT. C. BARRY, M.B., I.M.S.

TABLE- 2.

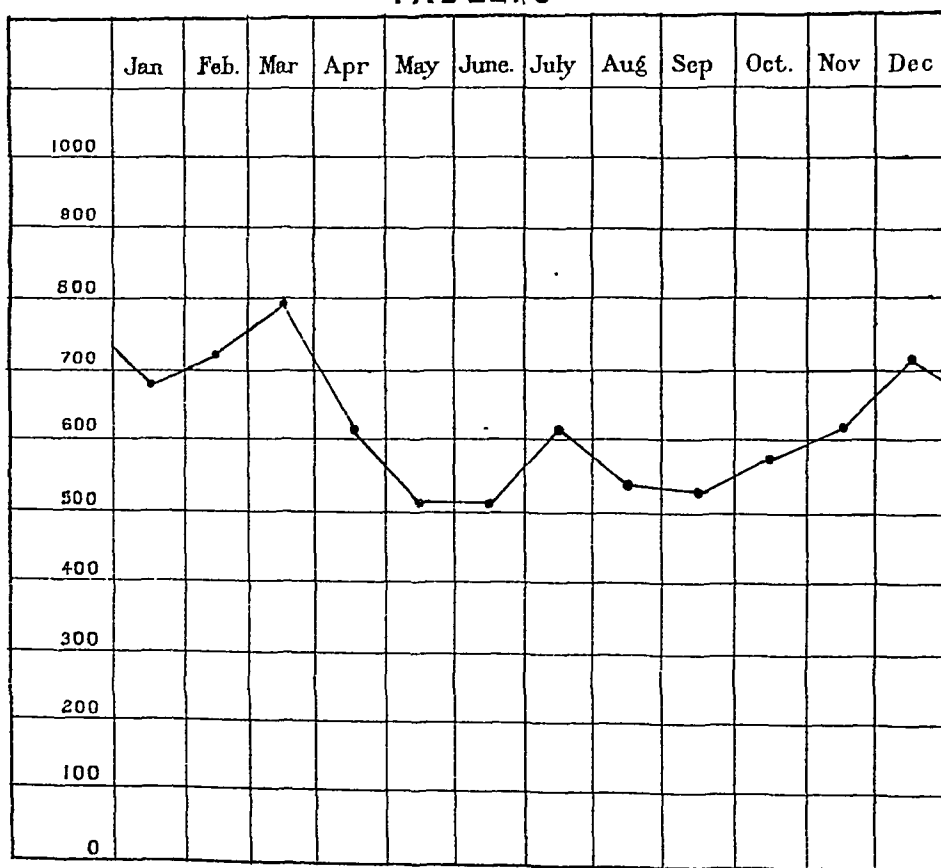
Table showing number of admissions in hospital for Beri-Beri from July 1896 to July 1899, month by month, & also the average Rainfall & temperature during same period.



NOTES ON BERI-BERI IN RANGOON

BY CAPT C. BARRY, M.B., I.M.S.

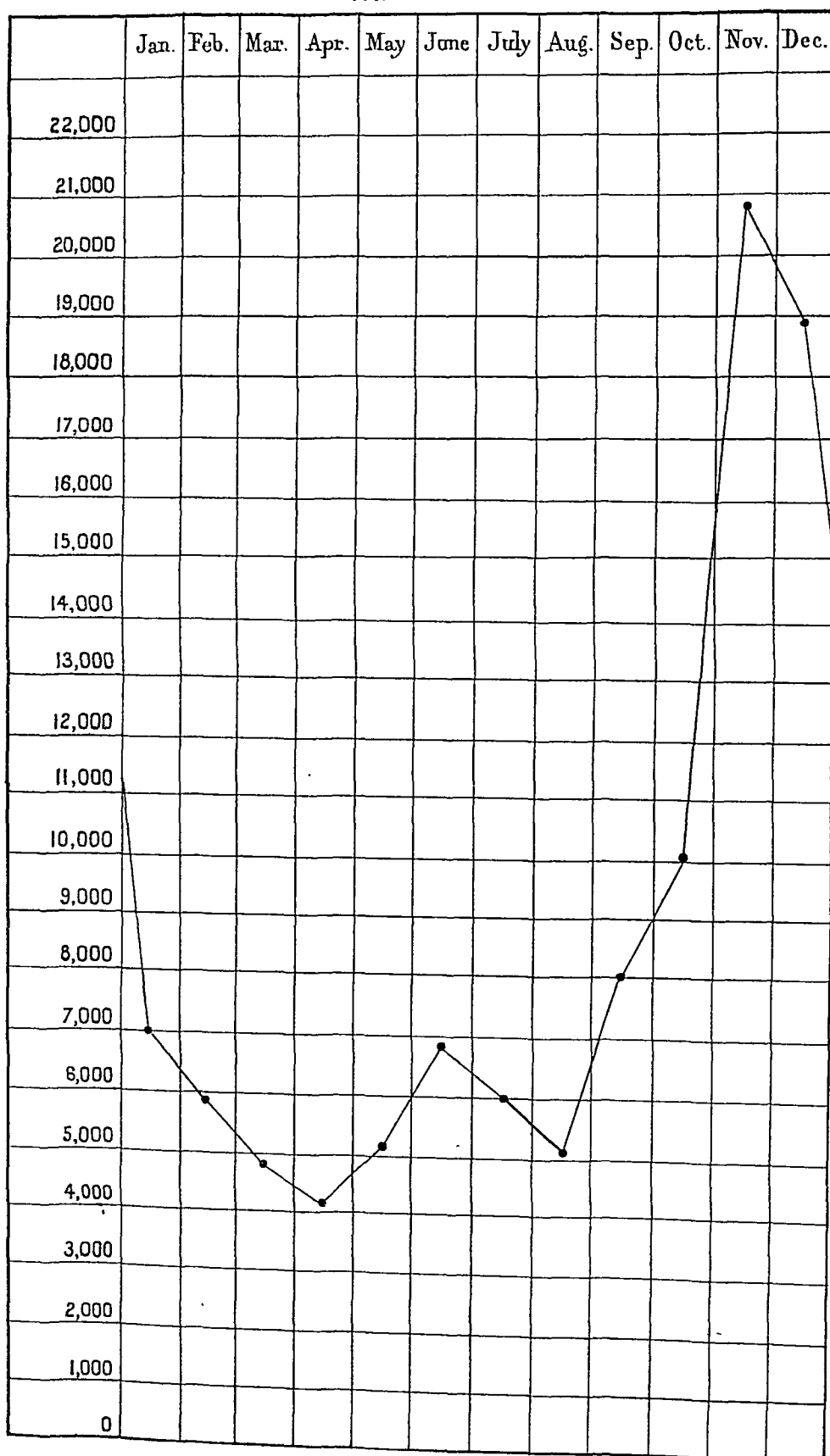
TABLE. 3



NOTES ON BERI-BERI IN RANGOON.

BY CAPT. C. BARRY, M.B., I.M.S.

TABLE-4.



plenty to eat. Their food, however, generally consisting of rice, vegetables and dried fish, meat they seldom eat, not because their caste prevents them, as the coolies consist almost entirely of very low caste Hindus who can eat meat, but because it is too expensive and too difficult to obtain in the jungle. As a rule also the patients have been living in poorly built houses when out in the jungle—houses built of thatch roofs, matting walls and mud floors; on this floor they frequently sleep without any raised sleeping platform such as the Burman uses. In addition the houses are, as a rule, kept in a filthy condition, and in consequence, even though they are from the nature of their construction well ventilated, they are both insanitary and very damp.

It is thus seen that this class of people exist under conditions which are favourable to acquiring Beri-Beri, *i.e.*, living in damp insanitary houses and eating a diet which contains but few nitrogenous elements, and in confirmation of the view that these are the conditions mainly responsible for the onset of Beri-Beri it may be mentioned that a large majority of the cases when admitted into hospital in a not very advanced state of the disease improve rapidly on being placed in a dry ward and being given a diet containing nitrogenous elements in the form of meat.

Unfortunately the coolies, as a rule, delay coming to hospital until the disease is far advanced, and in consequence a high death-rate is unavoidable. But still most marked improvement is frequently rapidly noticed, more especially so when a diet containing nitrogen in the form of bone marrow or ghee is given. As regards the coolies living in Rangoon they do not, I believe, suffer from Beri-Beri to nearly the same extent as those living in the district, at least this would appear to be the case from the number of cases that seek admission. This, I believe, is largely due to the fact that the Rangoon coolies live under better sanitary conditions, in drier houses with raised or cement floors, though there is no doubt that their houses are often greatly overcrowded. In addition also these coolies are, as a rule, better off, and meat is more easily obtainable in Rangoon. To much the same reasons I am inclined to attribute the comparative immunity of the Mahomedans and Burmans from Beri-Beri; they are, as a rule, a fairly well-to-do community, they live in better houses and eat a more nitrogenous diet. Burmans are still much more loathe than Hindus to come into hospital, but still if the disease was prevalent amongst them in anything like the same proportion that it is amongst the Hindus, one could not help coming across cases amongst the outpatients, whereas it is extremely rare to meet with cases of this nature amongst Burmans, though a large number of this race attend daily

for treatment and medicine for various complaints.

There is, therefore, I believe, little doubt that Beri-Beri is endemic in the delta districts of Burma, and it only requires subjects living under suitable conditions for the disease to become prominent and widespread.

ABSTRACT OF A PAPER ON THE RELATIONSHIP OF DRINKING WATER;—
WATER-LOGGING AND THE DISTRIBUTION OF ANOPHELES MOSQUITOES, RESPECTIVELY TO
THE PREVALENCE OF
MALARIA NORTH
OF CALCUTTA.

FROM THE PROCEEDINGS OF THE ASIATIC SOCIETY, READ
BEFORE THE ASIATIC SOCIETY OF BENGAL, JULY 1900.

BY LEONARD ROGERS, M.D., M.R.C.P.,

CAPT., I.M.S.,

Professor of Pathology, Medical College, Calcutta.

IN February last (1900) I carried out an inquiry into the health of the tract of country just north of Calcutta and extending up along the east bank of the Hooghly as far as Naihati, some 25 miles, with special reference to the prevalence of malaria. The percentage of people with enlarged spleens was taken as the most reliable test, and over 5,000 persons were examined by myself, the degree of enlargement of the organ being noted. The ground water levels were taken in as many wells as possible, as the unhealthiness of this part has for years been considered to be due to water-logging. The drinking water-supply was also noted, and the monthly number of admissions for fever in ten of the principal dispensaries for the last six years was compared with the monthly rainfall in order to ascertain the seasonal influences. Lastly, some observations were made on the distribution of the anopheles mosquito larvæ.

The following table shows the percentage of persons found to suffer from enlargement of the spleen in each municipality. They are arranged in order from above downwards, as they are situated on the map from north to south, while the easternly ones, which lie on the east bank of the Hooghly, are placed in the left, and the easternly ones, which lie at a little distance from the river, are placed in the right hand column, so that the table roughly represents their position on the map.

A glance at the table (which in the full paper is illustrated by a shaded map) shows that the places which are situated on the east bank of the Hooghly river have a much lower spleen rate than those further to the east, although the last five are but from one to two miles from the river. The question arises as to whether

the riverine parts are exceptionally healthy or the inland portions especially unhealthy for this part of Bengal, and in order to settle this I examined several hundred people in Busirhat

TABLE I.

Municipality.	Spleen Percent-age.	Municipality.	Spleen Percent-age.
Naihati ...	19.9	(Gobardanga) ...	(55.5)
Bhatpara ...	20.0		
Garulia ...	33.8		
North Barrackpur	36.5	(Busirhat) ...	(52.8)
Titagarh	37.8	Baraset	52.9
S. Barrackpur, W.	25.2	S. Barrackpur, E	56.0
Kamarhati, West	18.8	Kamarhati, East	34.8
Baranagar ...	17.8	North Dum-Dum	68.1
Chitpur-Cossipur	11.2	South Dum-Dum	32.3
		Maniktolla ...	13.2
Average ...	24.5	Average ...	41.0

and Gobardanga, which are situated some 25 miles further to the east, and found their spleen rates to be over 50 per cent. It is evident, then, that the riverine portions are exceptionally healthy for Lower Bengal, but the reason remains to be found.

One very marked exception will be found to the above rule, namely, that of Maniktolla, which although at some distance from the river, yet has a very low spleen rate, the lowest of all the thirteen areas except Chitpur-Cossipur,—facts which can only be explained as being due to these two municipalities being the only ones of the lot which have a full filtered water-supply. Moreover, this low rate occurs in spite of these two places being the most water-logged in the whole area, their ground water levels being but from four to five feet below the surface in the dry season, and from one to two feet down only during the rains.

This result was somewhat surprising in view of recent work on malaria, so advantage was taken of the fact that certain wards of some of the municipalities were partially supplied with filtered water, from standpipes provided by certain of the mills within them, to examine more closely into the question. The result was ample confirmation of the relationship of the water-supply to the spleen rate, illustrative examples of which are as follows: Naihati is divided up into five wards, beginning from the south. The first three are mainly inhabited near the river, and their spleen rates are 19.5, 10.8 and 19 respectively. The very low rate of Ward II coincides with a partial filtered water-supply from a mill, which is the only difference between them that can account for the figures. The two most northerly wards are mainly inhabited at a distance of about two miles from the river, and their water-supply is mainly from tanks, and although their ground water level is slightly lower than that of Ward III, yet their spleen

rates are 22.7 and 27.9. The water-supply of Wards I and III is mainly from the Hooghly. Still more striking are the figures for Garulia, in the northern portion of which is a mill which has been supplying filtered water for two years only, during which time the number of cases of fever treated at the local dispensary has fallen to about one-third of what it was before the filtered water came into use, and the greatest improvement took place in the very year that every other dispensary in this area showed a great increase of fever. As, moreover, the Native inhabitants were very positive that those who drunk the filtered water suffered much less from fever than those who did not, I decided to examine 100 people near the mill, about 80 per cent. of whom had drunk filtered water, and another series at a short distance away, but within one mile of the former, and living under identical conditions, but who differed from the former in not having been accustomed to drink filtered water. The spleen rate was found to be 21.1 per cent. in the former, and 55.5, or more than two and a half times as great in the latter, which strikingly confirms the local opinion as to the relative immunity of filtered water drinkers from malaria.

Titagarh, two out of the four wards of which have a partial filtered water-supply from mills, afforded a good opportunity of putting the matter to a crucial test, so a note was made of the water drunk by nearly all the people examined. The results are shown in the following tables:—

TABLE II.

Area.	Ground Water Level.		Drinking water-supply.	Spleen percentage.
	Feb.	Rains (1899).		
	ft. in.	ft. in.		
Ward IV	10 1	1 3	River and tank water.	48
Ward III	19 6	1 6	One-third drunk filtered water.	30
Ward II			82 per cent drunk filtered water.	19
Ward I	18 4	6 0	River and tank water.	54.8

The much lower spleen rates in Wards II and III which had a partially filtered water-supply, and that too in proportion to the number of persons examined who had drunk the filtered water, is evident. But this is not all, for it will be seen from Table III below that the spleen rate among 140 filtered water drinkers is 26.4 per cent., that among 179 river water drinkers was 41.8, while out of 55 tank water drinkers (who it should be noted form a minority here), it was no less than 67.2 per cent. Further, only 38 per cent. of filtered water drinkers in which the spleen was enlarged, was it consider-

ably (two fingers, breadth below the ribs) or markedly so, while in 62 per cent. it was only just felt between below the ribs. In river water drinkers it was much enlarged in 67 per cent., and slightly so in 43 per cent., while in tank water drinkers it was much enlarged in 73 per cent., and slightly so in only 27 per cent. Not only, then, is the spleen much more frequently enlarged in river and tank water drinkers than in those who drink filtered water, but the degree of enlargement is also much greater in the former than in the latter.

TABLE III.
SPLEEN PERCENTAGE AND WATER-SUPPLY.

ENLARGEMENT.	Filtered water.	River water.	Tank water.	TOTAL.
Spleen not enlarged	103	105	18	226
Spleen just felt ...	23(62%)	32(43%)	8(27%)	63
Spleen considerably enlarged.	9(24%)	26(36%)	15(40%)	50
Spleen markedly enlarged.	5(13%)	16(21%)	11(33%)	33
Total examined	140	179	55	374
Percentage of enlarged spleens.	26.4	41.8	67.2	39.5

If now the spleen rates for the different municipalities, as shown in Table I and in the map, be examined in the light of the figures just given, it will be evident that the differences in the water-supply will explain all the facts in a way that no other hypothesis will do. Thus, Chitpur-Cossipur has the lowest spleen rates, and it has the double advantage of both a full filtered water-supply and close proximity to the river. The influence of the latter is well illustrated by the fact that the spleen rate of the two riverine wards is only 7 per cent., while that of the other two wards, which are from one to two miles from the river, is 15 per cent., or just about the same as that of Maniktolla, which is similarly situated. The obvious explanation is that those who do not take the trouble to get the filtered water will drink river water in the wards on its bank, while in those at a distance they will drink tank water. The same point is illustrated by the difference between the spleen rates of the western portions of Kamarhati and South Barrackpore and the eastern portions of the same municipalities, the former with a water-supply from the river having just about half the spleen rate as the latter with only tank water for drinking purposes. In short, the much lower rate of the riverine parts is due to the difference in the water-supply; for, as will be shown presently, there is no essential difference in the ground water level which can explain this distribution. The good effect of even a partial water-supply is once more shown by the ward variations of the spleen rate in Baranagar and South Dum-Dum. In the former

the lowest spleen rate, namely, 11.6, is met with in the most southerly of the riverine wards, which border on Cossipur; and I found that many of the inhabitants of this small ward were getting their filtered water from Cossipur. Again, the only ward which is at a little distance from the river in this municipality has the highest spleen rate, being dependent on tank water to a great extent.

South Dum-Dum is divided into three wards, and one of these which borders on Cossipur, from which many of the people whom I examined were accustomed to get filtered water, had only a spleen rate of 11.8, against one of 35.4 and 45.3 in the other two wards which had only tank water, although in all other respects I could find no difference between the wards. The very fact of the people taking the trouble to carry filtered water from a distance, and their robust belief that they to a large extent escape fever by so doing, must be allowed some weight in favour of the correctness of their belief. The whole of the evidence, then, points to the water-supply as the determining factor in relationship to the relative amount of malaria in this tract of country, but other possible factors must be considered, the most important of which is water-logging.

WATER-LOGGING AND THE RAILWAY.

It has already been pointed out that Maniktolla and Chitpur-Cossipur are the most water-logged parts of the whole area, and yet they are the least malarious, owing to their filtered water-supply. Further, an examination of the spleen rate and the ground water level ward by ward shows that there is no relationship between the height of the ground water level and the percentage of inhabitants with large spleens, for although at first sight the fact that the bank of the Hooghly river is very slightly higher than the surrounding country, so that the drainage flows away from the river and eventually finds its way back through khals, or runs into the Great Salt Lake to the east of Calcutta, might appear to indicate that the eastern portions of this area must have a higher ground water level than those near the river bank. Measurements in the wells, however, do not bear this out, for there is very little difference in this respect, while what little there is is rather more frequently in favour of the eastern portions than against them. Further, if different wards of the same municipalities are compared, no definite or constant relationship between the slight variations in the ground water level which are met with and the spleen rate is found, as a study of the tables in the full paper or the map will show.

The Eastern Bengal Railway, which runs from north to south through this area, and, together with the Grand Trunk Road, roughly divides the

western and eastern portions, has frequently been held to be responsible for the unhealthiness of the country, for it lies across the line of drainage. As, however, the drainage flows from west to east, it is obvious that if it materially obstructs the drainage, the part to the west of its course should be the more unhealthy, while precisely the opposite is the case. Moreover, in places in which wells were found on either side of the railway, although not very near it, there was no marked or constant difference in the ground water levels on either side of the railway. The differences in the spleen rates in this tract of country cannot, then, be explained on any theory of water-logging, or interference with drainage by railways or roads, although the natural drainage is certainly bad as in North Dum-Dum.

Again, it might be thought that the lower rate in the western parts might be due to greater density of population, and consequently less few breeding grounds for the anopheles mosquitoes. With regard to the former it may be pointed out that there was practically no difference in the spleen rate of the densely populated western portion of Maniktolla and the very sparsely populated and somewhat more water-logged eastern part of the same place, both having a filtered water-supply, and other similar instances could be given. Further, the great differences in the spleen rates of the contiguous wards of the same municipalities in which every condition except the water-supply are precisely similar, which have already been detailed, cannot be explained on any theory of varying density of population, or of mosquito breeding grounds.

DISTRIBUTION OF THE ANOPHELES MOSQUITOES.

The question of the relationship of the anopheles mosquitoes to the prevalence of malaria remains to be considered. It must now be taken as proved that malaria may be communicated to man through the bites of mosquitoes which have some days previously bitten another case of malaria, but it still remains to be proved whether this is the only or even the most common cause by which this protean disease is communicated. The point is one of the utmost importance to Bengal, one of the principal homes of malaria, for if the disease is only communicated by the bites of these tiny pests, and they only breed in certain small pools, namely, those which are too small to harbour fish, yet not so small as to dry up in a day or two, as Major Ross states is the case, then by searching out these breeding grounds and destroying the larvæ in the pools, we may hope with Ross to at least rid towns or small areas of malaria. Unfortunately I have not been able to confirm these last statements of Ross, for both at Gobardanga and at Maniktolla, which are at the extreme of this tract of country under obser-

vation, I easily found numerous anopheles larvæ both in tanks and in smaller pools, all of which contained very numerous fish. As it was impossible to minutely examine 100 square miles or so of this area, I determined to map out and closely search all the pools and tanks in a small area of the Maniktolla Municipality. The results which were obtained are as interesting as they were unexpected. I much regret that I have not been able to confirm Major Ross' observations as to the very localised and small number of the breeding places of anopheles mosquitoes. On the contrary, I found them very commonly in large tanks, and that too in spite of most of them swarming with fish. In fact, in the dry season, when small pools are few in number, the tanks are the common breeding place. Further, although I found them in two out of three very small pools (from two to five yards in diameter), and with but some two inches of water in them, these pools also contained small fish, which during some time that I watched them did not touch one of the anopheles larvæ which floated temptingly past their noses, although they eat several small beetles, which they appeared to prefer. If, then, the larvæ can survive in spite of fish in such tiny pools, is it any cause for wonder that they live in tanks?

The question then arises as to whether there is any relationship between the number of anopheles and the amount of fever, in order to test which I resolved to make a monthly examination of the some thirty tanks, together with any pools near them in a small area of Maniktolla. These observations will have to be continued for a year, but it may be mentioned here that during the dry season, when malarial fevers were at a minimum, from one-third to two-thirds of the tanks have been found to harbour the anopheles larvæ, and that too at a time when three visits to the local dispensary, after having given notice that all fever cases were to be kept for me to see, I failed to obtain a single case. Yet some of the tanks were estimated to have contained over one million larvæ, so thickly were they lying near the leeward bank in particular. In short, it would have taken a very large number of the small pools to harbour as many larvæ as one of these tanks, so that in this area, at any rate, the tanks form the principal breeding ground in the dry season at any rate. It will be very interesting to see what happens in the rainy season, but I may mention that after the recent heavy rain the larvæ nearly disappeared from the tanks, and were enormously reduced in numbers in spite of several new small infected pools having appeared, so that further observations promise to be of interest.

The importance of the above observations lies in the impossibility of destroying all the anopheles larvæ in even a very small area in Bengal, for the thirty tanks mentioned above all lay within

an area of one-sixteenth of a square mile, and formed but a small fraction of these of the very small municipality of Maniktolla, so that unless some very much more potent method of destroying mosquitoes is discovered, I fear that Bengal will not have its malaria much reduced by Ross' ingenious suggestions. If, too, all malaria is due to the bites of these mosquitoes, and they are present in such great numbers in the minimal fever season, how many will be found in the maximal fever period, and how great will be the difficulty of destroying them?

It may be objected that many of the anophles found by me in the tanks were varieties which do not carry malaria, but until we know which are harmless and can easily distinguish them at a glance, this will not lessen the difficulty of destroying the really dangerous ones, if indeed any of them are harmless.

The importance of the action of a filtered water-supply in greatly reducing the amount of malaria, which has been demonstrated in this paper, is enhanced by the great difficulty of destroying the malaria-bearing mosquito, and also raises the question as to whether these insects may not carry the infection from cases of fever back to the water of tanks, etc., and the disease may not commonly be obtained by drinking such infected water, which has for centuries been considered to be a frequent method or medium through which the disease may be obtained. This important question can only be settled by experiment, which I hope shortly to be able to undertake.

Lastly, many charts have been made showing the monthly number of fever cases treated in the dispensaries of this area together with the monthly rainfall. It appears from these that the conditions which influence the amount of fever in different years is a general one, for all the dispensaries show very similar curves in the same year (except when the water-supply has been materially altered as in the case of Garulia) so that some general cause must have been in operation. On the other hand, there is no definite relationship between low or heavy annual rainfall, and the amount of fever, as I have shown elsewhere,* is the case of laterite soil with rapid ground water variations. There does, however, seem to be some relationship between the daily distribution of the rain and the amount of fever, but my observations on this point are not sufficiently advanced to allow of any definite statement on the subject at present.

The broad result of the present inquiry, then, is simply that there is a very definite relationship between the drinking water and the amount of malaria, as judged by the spleen rate in this alluvial area.

* *Lancet*, March 12th, 1898.

A CASE OF CONTINUED FEVER (REMITTENT FEVER? ENTERIC FEVER?)

By D. B. SPENCER,
LIEUTENANT-COLONEL, I.M.S.

SEPOY TORA KHAN, of the Hongkong Regiment, a stalwart Punjabi, was brought to hospital in a doolie about midnight of 30th December 1899, suffering from fever.

History.—He was on four months' furlough at his home (*Chānki*) in the district of Shahpur, Punjab, and as it was about to expire he left his home and arrived at Calcutta on 17th December to sail for Hongkong to rejoin his regiment. He was perfectly well so far, the last illness being a year and-a-half ago at Hongkong, when he had about a week's fever. From 17th December, the date of his arrival at Calcutta, to the 30th December he was living under canvas in the Native Infantry Lines in Alipore, preparatory to his embarkation. He stated that the fever was of three days' duration, and that it was ushered in with a rigor lasting from three to four hours; further that he did not come to hospital earlier, being in hopes, till the last moment, that he would be able to go with his other comrades to Hongkong.

Condition on Admission.—About midnight of 30th December when he was brought to hospital his temperature was 103.4°F. in the axilla, pulse 120, great restlessness with severe headache and general aching pains, but beyond these symptoms, there was nothing to indicate the nature of the fever.

31st December 1899.—Morning temperature, normal; evening temperature, 102.4°; no fresh symptoms; the case was diagnosed as ague; treatment: quinine mixture (10 grains to the ounce) to be given four times in the twenty-four hours, equal to 40 grains per day.

1st January 1900.—Morning temperature, 99°; evening temperature, 102.8°; no fresh symptoms; continue treatment.

2nd January 1900.—Morning temperature, 102°; evening temperature, 103.4°; continue treatment.

3rd January 1900.—Morning temperature, 101°; evening temperature, 103°; constipation marked; spleen and liver normal in size; heart's sounds normal, its action very excited; respiratory murmur harsh in places; urine scanty, high-coloured, sp. gr. 1022; no blood or albumen; continue treatment. Ordered also tepid sponging.

4th January 1900.—Morning temperature, 100.4°; evening temperature, 103.4°. Bowels opened once by enema; continue treatment.

5th January 1900.—Morning temperature, 103.2°; evening temperature, 101.6°; the fever is high and persistent; vomited four times, the vomited matter being bilious in character; the tongue is thickly coated, and the smell from the mouth somewhat unpleasant; ordered quinine to be increased from ten to twenty grains per dose, to be given three times with a drachm of nitric ether in each dose.

6th January 1900.—Morning temperature, 102.2°; evening temperature, 101.8°; the disease was changed to-day from "ague" to "Remittent fever." Has had troublesome cough as a new feature, expectoration being scanty and free from blood; vomited twice; bowels opened twice by an enema; complains of pain and burning sensations in the umbilical region; is groaning continuously; there is no eruption of any kind; mental

faculties normal, but the expression of the face is dull, and the eyes half-closed; continue treatment; ordered also four soda-acid powders.

7th January 1900.—Morning temperature, 101°; evening temperature, 101.4°; gastric irritability less; still groaning a good deal; had no sleep last night; bronchitic signs present; bowels moved once; expression of face continues dull and heavy, but there is no delirium; continue treatment; also ordered a dose every two hours of stimulating diaphoretic mixture with two drachms of brandy in each dose; a quarter of a grain of morphia to be given hypodermically at bed-time.

8th January 1900.—Morning temperature, 101.2°; evening temperature, 102°; slept fairly well; continue treatment.

9th January 1900.—Morning temperature, 100°; evening temperature, 101.4°; is feeling better, but the pulse is not very favourable; continue the stimulating diaphoretic mixture, but stop the quinine, as cinchonism and the feeble state of the pulse do not warrant its continuance.

10th January 1900.—Morning temperature, 99.4°; evening temperature, 101°; general condition same as yesterday; continue treatment.

11th January 1900.—Morning temperature, 99°; evening temperature, 101.6°; general condition same; continue treatment. A microscopical examination of four slides of blood for malarial parasites was made to-day with negative results.

12th January 1900.—Morning temperature, 99.6°; evening temperature, 101.8°; general condition though feeble is still favourable; continue treatment.

13th January 1900.—Morning temperature, 100.2°; evening temperature, 102.8°; bowels moved once, the stool being greenish and offensive; continue treatment.

14th January 1900.—Morning temperature, 99.6°; evening temperature, 102.6°; had slight delirium last night; bowels opened three times, character of stools same as before but more liquid; general condition not so favourable; there is still no sign of any eruption; liver and spleen are normal in size; there is some tenderness and gurgling in the umbilical and right iliac regions; answers questions rationally, but is unwilling to speak or to take any nourishment. Continue treatment.

15th January 1900.—Morning temperature, 100°; evening temperature, 102.8°; bowels opened twice; character of stools same as before.

The Widal test was applied to-day with a negative reaction.

16th January 1900.—Morning temperature, 99.6°; evening temperature, 102.2°; bowels opened three times; the skin is moist; the tongue is coated with a thickish creamy coat; bronchitic signs still present; continue the salicylate mixture.

17th January 1900.—Morning temperature, 100.4°; evening temperature, 102°; slight diarrhoea continues; face continues dull and drowsy, and the mental faculties are sluggish, but answers questions rationally.

18th January 1900.—Morning temperature, 100°; evening temperature, 101.4°; slept well. Is much exhausted; continue treatment.

19th January 1900.—Morning temperature, 101°; evening temperature, 99.4°; bowels moved once; continue treatment.

20th January 1900.—Morning temperature, 100.2°; evening temperature, 99.4°; general condition improving; continue treatment.

21st January 1900.—Morning temperature, 99.8°; evening temperature, 99°; general condition improving; give him now only three doses of the mixture, in the twenty-four hours.

22nd January 1900.—Morning temperature, 99.8°; evening temperature, 99°; is now much better; stop the salicylate mixture, and give him acid-chliretta tonic mixture, *t. i. d.*

31st January 1900.—Is still very weak, but has been free from fever; continue the tonic mixture.

8th February 1900.—Is quite convalescent, being now over five weeks in hospital; recommended for change of air for three months and discharged from hospital, the leave being granted.

Summary of the case.—Opinions may differ about the diagnosis of this case, but I think this is another case similar to the one described by me in my pamphlet on fevers as "Tropical Fever," and not unlike the one published lately by Maddox in the *Indian Medical Gazette*. It is, I think, one of those cases of so-called "Enteric" fever in this country in which the clinical and pathological characters often vary greatly from those of true typhoid fever as seen in Europe and other cold countries, and to which frequent references have been made, in years past, by the Sanitary Commissioner with the Government of India in the annual Blue-books.

I am indebted to Major Drury, I.M.S., Professor of Pathology at the Medical College, Calcutta, for the bacteriological examinations without which this case would lose much of its value. The Widal test was applied on the 19th day of the disease, a fresh bouillon culture of typhoid bacilli being used for the test. The blood-serum* used was of one in ten strength.

Apart from the negative reaction by the Widal test, which is good proof in itself that the case was not one of true typhoid fever, the absence of any history of typhoid infection through any source, the sporadic nature of the case, the absence of any eruption, the absence of a marked typhoid state such as would be expected in a case of this severity and the irregularity of the temperature chart are, I think, corroborative evidence to show that it was not typhoid fever.

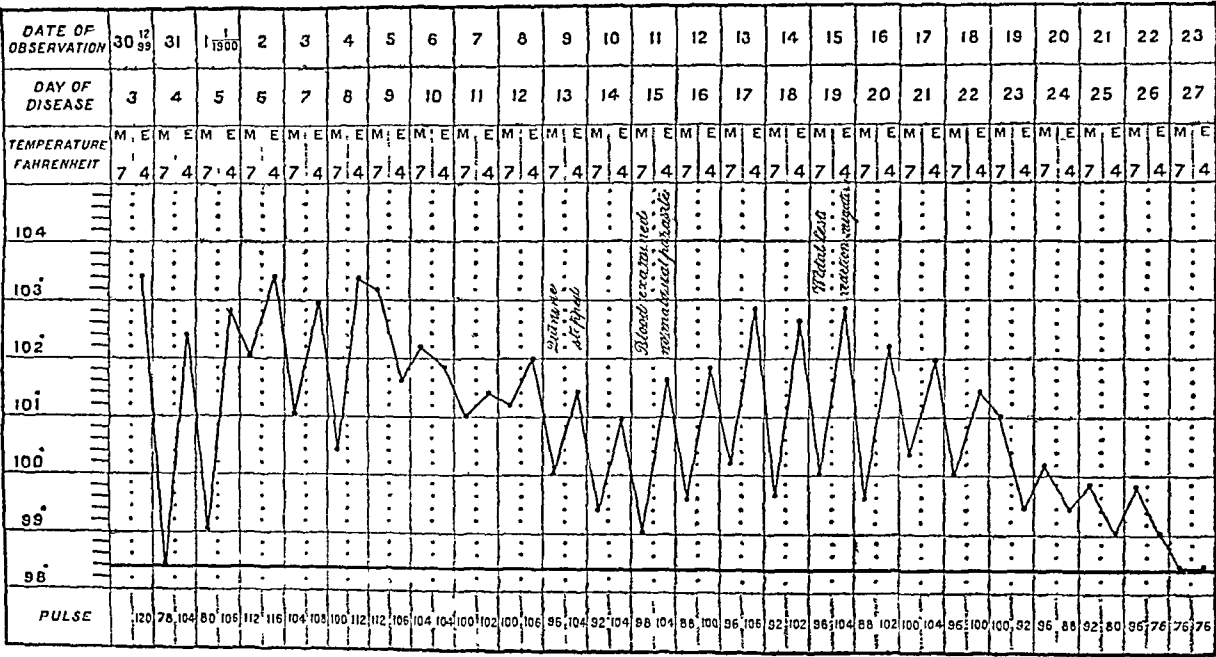
This man was certainly exposed to malarial influences before his illness began as he had to live in a tent for about a fortnight in a damp and malarious place like Alipore, at a time of the year when malarial fevers were prevalent; but apart from the absence of the plasmodium in the blood on the 15th day of the disease, we have to consider the unusual duration of the fever (for a case of remittent fever), the absence of any appreciable hepatic or splenic enlargement, and the apparent failure of the specific treatment by quinine. From a perusal of the notes, it will appear that the quinine treatment was steadily carried out up to the 13th day of the disease, when it had to be stopped completely owing to its depressing action on the pulse and heart, and that it was replaced by an expectant and general treatment to the termination of the febrile state on the 27th day of the disease.

As regards the temperature chart, which was a most valuable guide throughout the case, it may be stated that the temperatures recorded in the chart were regularly taken morning and evening at 7 A.M. and 4 P.M., respectively, and

* The serum used was taken direct from the patient from a blistered surface under aseptic precautions.

A CASE OF CONTINUED FEVER (REMITTENT FEVER? ENTERIC FEVER?)

BY LIEUT.-COL. D. B. SPENCER, I.M.S.



that to guard against error they were also taken at different hours of the day and night, with the result that the highest ever noted was a 104.2 on the night of the 8th day of the disease, and that the minimum was 99 on three different occasions apart from those recorded in the chart. The fever, therefore, was of the continued type, although some may prefer to call it the remittent type, an expression which, I think, is a misnomer for reasons given in my "Record of Fevers."

From the foregoing summary it will, I trust, be sufficiently clear that, whatever this fever may have been, one cannot be justified in calling it "Enteric Fever," and that is my main contention, for to call it so would be not only to mislead oneself but to mislead others.

General Remarks.—One swallow does not make a summer, and a single case like the one just recorded cannot likewise be expected to prove much even with the bacteriological tests given. But cases of this nature do not occur every day, and so it is difficult to present a dozen cases at once. Still, I think, even this single case teaches us something, for, it emphasizes the necessity there exists for careful scrutiny differentiating fevers of a continued type in India and corroborates the view held long ago by Sir Joseph Fayrer, *viz.*, that every fever with enteric symptoms we see in India, need not necessarily be a case of true enterica. I believe Colonel Crombie, I.M.S., has likewise prominently drawn attention to this point in his able address on the "Unclassified Fevers of the Tropics," and I feel sure that if individual opinions be collected among experts in India, a certain number will at all events come forward to support this view.

I have lately advocated the same view both in the "Record of Indian Fevers" and in the essay on "Enteric Fever in India" published in the *Indian Medical Gazette*, and have endeavoured to show (a) that Indian enterica is not always the result of sewage contamination associated with the typhoid bacillus; (b) that intestinal intoxication of bacterial origin occurring under certain predisposing and exciting causes (in which the colon bacillus plays the chief part) is its *probable* cause, and I have consequently come in for some hostile criticism from the medical press, which criticism, however, is somewhat disappointing from the fact that it does not help us much in the solution of the enteric problem.

One must expect to meet with some scepticism and opposition in starting a new proposition, whether it be a mere fad or a scientific truth in its infancy. If, therefore, I mention this hostile attitude of my critics, it is not to complain of it, but to express the hope that medical men will form their own independent judgment on the merits or demerits of the views I am advocating

without being biased by any comments made upon them.

I believe I am right in saying that a certain section of medical men in India pin their faith upon the typhoid bacillus associated with sewage, and believe that nothing but this bacillus can be the cause of enteric fever as seen in India. It is, I think, the duty of those who maintain this view to explain in detail the various anomalies connected with the enteric question before that question can be finally set at rest. This is a friendly challenge which must be accepted in a friendly spirit. The enteric question cannot be made a party question. It is one in which the Government and the public are as much interested as medical men. The pecuniary loss to Government every year from mortality and invaliding among British troops and officers must be a considerable item. The importance of the question is therefore obvious, and I trust these few remarks may not appear to be entirely out of place.

Whatever may be the ultimate solution of the enteric question, there is one thing which cannot, I think, be too strongly deprecated, and that is the present trend of medical opinion to discount clinical features and temperature charts in fever cases and to make the presence or absence of a particular bacillus the chief criterion in the diagnosis and treatment of a fever case. In my humble opinion this is a great mistake.

I hope, however, my remarks will not be misunderstood. I have no wish to undervalue the efforts of bacteriologists to throw light upon the etiology of disease, or to find remedial measures, protective and curative, in the domain of serum-therapy. No one can deny the fact that bacteriology has within recent years thrown an important light upon the etiology and treatment of various diseases and thereby vastly benefited mankind. What I wish to impress upon the reader is merely my conviction that, in fevers at least, the chart and clinical features of a case are just as important, if not more so than the indications of the microscope, and that the correct procedure would be to *base* the diagnosis on the former and to *confirm* it subsequently by the latter whenever practicable. Any other course seems to me to be like putting the cart before the horse, for, the fact must be remembered—if any additional evidence in support of this contention be necessary—that even in health we carry about with us a number of pathogenic germs which are specific to many diseases, and that, consequently, errors are likely to occur if we relied solely on those germs to guide us in the diagnosis and treatment of disease. Nor, in advocating the view that Indian enteric fever is not always a disease of insanitation, do I wish to imply for a moment that there is no need for sanitary reform in India, a much larger question. No one who knows anything about India can possibly entertain such a view. But, sanitary

reform in India and the etiology of Indian enteric fever are, I think, two separate questions and, as such, they should be separately considered.

In conclusion, I may be permitted to express the hope that my professional *confrères* in India who may be interested in the enteric question will, by way of co-operation and in the interests of science, publish similar cases with their opinions and thus corroborate or confute the theory I have put before the profession regarding the etiology of enteric fever in India.

SERUM TREATMENT OF PLAGUE.

By B. KASCHADAMOFF, M.D.,

Russian Medical Service.

(Continued from page 254.)

THE difference in favour of the former is 18.5. The first method may be considered unreliable as we may think the selection was not regular. In order to prevent people from talking the second method was introduced, experiments of which have not been finished up to the present. From all previous reports we know that the difference in favour of serum is about 13 to 15 per cent., that is, nearly the same which we arrived at by the first method. The question now arises, how are we to look at this difference? Is it great or so insignificant as to be unworthy of notice? Taking into consideration that the majority of patients admitted into hospital come very late, that is to say, when the disease has so far advanced that the half of them die within the first two days of their admission, and that the usual percentage of recoveries remains at 25, we must positively affirm that the difference, 13 to 15 per cent., is very favourable.

We may be quite sure, that if the serum be administered during the first stage of the disease, the percentage of recoveries may be expected to rise to fifty or even more. From these results of the treatment of plague with Italian serum, and not having been able to try our serum, made in St. Petersburg, on so large a scale, I decided to begin my experiments on monkeys, wishing to study the comparative curative influence of both serums. I took for that purpose the same Italian serums, which were used in the Arthur Road Hospital, and compared them with the serum which I got from St. Petersburg several months ago.

All the experiments were made in the usual way. For each of these I took a group of monkeys of not less than six, part of which was left under control. The animals were infected subcutaneously with plague culture of two days' growth upon agar-agar, to such an extent that each monkey received not less than an inch of space of culture, removed from the tube of agar-agar and dissolved in 3 to 5 cc. of sterilised water.

The injection was given the first time six hours after infection; the second, the day after; and at times the third, two days after.

Each dead monkey was subjected to a careful *post-mortem* examination. When the pathological anatomical changes were characteristic of plague, when stained preparations of blood, spleen and lymphatic glands exhibited the presence of the plague bacillus, when from these organs pure cultures of plague were obtained, then only was it considered that the animal had died of plague. The first two experiments were performed on eighteen monkeys with Russian serum, the third on twelve with Italian, and the fourth on eighteen with both. The following is the description of the individual experiments:—

First experiment, 30th November 1899.

Six monkeys were taken, three of which were controls, and three were treated with serum three months old. Each monkey received 10 cc. of serum. All controls died from 3 to 3½ days. Of those treated with serum one died after 1½ days, but not of plague; another died after 6½ days of plague, and the third recovered.

Second experiment, 16th December 1899.

Twelve monkeys were taken, four of which were controls, and eight were treated with the same Russian serum. The first three controls, died from 4 to 5½ days, the fourth after 17 days of plague. Of those treated with serum one died two days after, not of plague; one 5½ days after, and one 8½ days after; that is, we have out of seven monkeys five recovered (71 per cent.).

Third experiment, 1st February 1900.

Twelve monkeys were taken, four controls and eight treated with Italian serum of 1½ months old; each monkey received from 12 to 14 cc. of serum, and two out of them 5 cc. more. All the controls died from 4 to 6 days. Out of those treated with serum one died 2 days after, not of plague; one 4½ days after, and one 6 days after; that is, out of seven we have five recoveries (71 per cent.).

Fourth experiment, 3rd March 1900.

Eighteen monkeys were taken, four controls, seven treated with Russian serum and seven with Italian. Of the controls three died from 3 to 4½ days, and the last one recovered.

Of those treated with Italian serum all died; two died 3 days after, three 3½ days, one 4½ days, and one 5½ days after. Of those treated with Russian serum six died, and one recovered. Of the deaths one died 4 days after, two 6½ days, one 8 days, one 8½ days, and one 12 days after (the last one not of plague). I must add that I had a very virulent culture in the last experiment, but the amount of it given was as usual.

By these experiments we may say that both the serums in their curative influence are very nearly alike as they have given the same results

in individual treatment. Besides this the last experiment in which both serums were tried under exactly similar conditions, stands in favour of Russian serum, because the animals lived longer and one recovered.

I do not wish to deal here with the difference in influence of two serums. It is enough for me to say that the two serums may have an equally beneficial influence under favourable conditions.

On the one hand, hardly any one ever receives at the time of infection such a large quantity of the plague culture as we give monkeys; on the other hand, not a single plague patient receives treatment so soon after infection as our monkeys. Even if we have about 70 per cent. of recoveries under these conditions, we may positively assert that we shall have similar results among patients, if we should be able to treat them as early as possible after infection. What are the precise conclusions we may draw from these experiments?

(1) Each serum in whatever way it is prepared may be beneficial for plague patients.

(2) Even the serum of six months' standing does not lose its strength. Taking into consideration the results, received in India and Portugal on patients as well as our experiments, we have the right to say, that the serum in experienced hands is a precious medicine against plague. We must therefore put aside all mistrust and give it on all occasions without any fear, as the serum in such a quantity as 200 to 300cc. is perfectly harmless.

Being in possession of the facts that we have the preventive inoculation of Haffkine and the serum treatment, we may have less fear of plague than formerly, not forgetting at the same time the improvement in the general sanitary conditions of life.

A Mirror of Hospital Practice.

TWO CASES OF "STONE IN THE URETER."*

By W. K. HATCH, F.R.C.S.,
LT.-COL., I.M.S.,

Principal, Grant Medical College, Bombay.

ALTHOUGH cases of renal colic are frequently met with in Bombay practice, it seems that only a few patients require surgical assistance from obstruction of the ureter by calculus.

I myself have seen but few and do not remember to have read cases of this kind in the Indian medical journals. Both among Europeans and Parsees, it is not uncommon to meet with instances in which renal colic has been followed

by the passage of the stone into the bladder or the urethra, whence it has been removed by the surgeon or has passed naturally during micturition.

There are also several specimens in the Grant College Museum showing kidneys stuffed with calculi or with calculi impacted in the ureters. It seems curious, therefore, that a few should have been operated upon. Calculous disease is not, however, so common in Bombay as in other parts, and few of the patients admitted into hospital have resided for any length of time in this city; most of them come from Salem, Nasik and Ratnagiri, a few from Thana, and occasionally a resident of Sindh, who has escaped the zealous surgeon in that part of India, has sought admission into the Jarnsetjee Hospital. My experience of stone in the kidney or ureter is, therefore, small, and when one reads the numerous uretral cases reported in the English medical journals and hears of the large experience of surgeons in London and the large towns of England (in which vesical calculus is rare as compared with India), it becomes difficult to understand why this difference should exist, if it does exist.

It, therefore, seemed to me that it would be useful to publish some cases of impacted uretral calculus for which operations had been performed, especially as there are so many surgeons in different parts of India whose experience in litholapaxy is larger than mine, notwithstanding the fact that I have been for a good many years at a large hospital, in which, however, the number of stone cases is seldom over 50 per annum. The two cases, although fatal, are of considerable interest.

CASE I.—European, aged 55 years, had had some years before an attack of renal colic of brief duration; he had always been an active man with no history of gout or rheumatism in his family, and his health had always been excellent. One evening in January 1898 he was seized with pain in the right testis, and slight retraction; on account of the pain he was unable to sleep, and the abdomen became distended, the pain extended to the right iliac fossa in the night, and no urine was passed. Next day only a few drops of urine were expelled, and the bladder was empty, the tongue was clean, and there was neither fever or vomiting and no headache. The abdomen was slightly distended. On the following day about half a liqueur glass of urine was passed, and the bowels were well opened; in the evening he suffered from slight headache, and was somewhat anxious what his condition. The pulse was 60, rather hard and full; slight pain in the loins was complained of; after drinking a little water he vomited once. No tumour in the loins. On Thursday the symptoms were more pronounced; he had a bad night, passed the same small quantity of urine and felt rather more

* Unavoidably crowded out of Special Stone No.—ED., I.M.G.

uncomfortable and anxious, eyelids and cheeks a little puffy. He vomited twice, and said that he felt rather dull, the bowels were freely open. Suddenly at about 9-30 A.M. he felt an inclination to micturate, and passed about 12 oz. of urine; again at 11 o'clock and 12 he passed the same amount and felt somewhat relieved and more cheerful, the pulse became softer. After this the symptoms passed off and he regained his usual health, but he complained of a throbbing pain in the right loin which was relieved by fomentations.

The urine during the attack was slightly turbid; sp. gr. 1018; no sugar or albumen; a few cells, thought to be pus cells, were found.

During his illness he was attended by Major Childe, I.M.S., to whom I am indebted for notes. I saw him in consultation and agreed that there was probably a stone in the right kidney, and that the left kidney had ceased to work from sympathy with the affected one, or to put it more correctly from reflex irritation. After an interval of several months, during which time a considerable amount of flesh was put on, chiefly fat, his appearance was not so healthy as it had been, the complexion being less clean and ruddy. He was no doubt more tired after work and not so quick mentally. Again suddenly a second attack occurred, and for the first five days the symptoms did not appear as serious as on the first occasion, more urine was passed altogether, daily about 6—8 oz., the pulse was full and hard. On the sixth day he complained of more headache and dulness than usual, the face and body generally appeared pretty and swollen, and the complexion sallow; a slight urinous odour was present. Some pain was felt in the right loin and on firm pressure slight tenderness was complained of. I detected a distinct resistance, deep-seated in that region. His state remained much the same, and in fact about an ounce more urine was passed on the eighth day, but the pulse was decidedly harder and fuller, and the fullness more marked in the right loin. As it was evidently useless to wait further in hope that the calculus might be displaced, as had happened before, I decided to operate. The patient readily agreed, and on the morning of the following day with the assistance of Major Quicke, I.M.S., and Mr. Masina, I made the usual lumbar incision; the kidney was at a great depth from the surface, and it was all I could do to reach it and open the pelvis, on passing the finger into the ureter the base of a calculus was felt at a distance of $\frac{1}{2}$ inch from the opening. By steadying the tissue below this point, I was enabled to introduce a forceps and take hold of the stone which had much the shape and size of a revolver bullet and was composed of uric acid. There was free hæmorrhage, and the kidney which was considerably enlarged had a tense feel (previous to the incision in the pelvis). During the day there was free escape of

urine from the wound, and a rapid improvement in the general appearance, the puffiness and abdominal distension diminishing to a remarkable extent. Next morning, however, he was distinctly more feeble, and the pulse which previous to the operation had been so full very rapidly became weaker. He died during the day, having become slightly delirious towards the end.

CASE NO. II.—The patient, an old man of about 60 years, was admitted on the 15th of November 1899 into the Jamsetjee Jeejeebhoy Hospital. He was a servant by occupation and had been in the mutiny, at the battle of Kirkee, &c., and as a young man had no doubt taken too much alcohol and opium, but for the last 20 years he had been perfectly steady and enjoyed good health. I had operated some years ago on his son for a small vesical calculus which caused an attack of renal colic, and subsequently was detected in the bladder. About a year before the present attack he had a very severe illness, fever with pain in the back and passage of pus in the urine; from this he recovered, but was much weakened. Six months later he was attacked by severe rigors, fever and pain in the lumbar region; there was no swelling then, but a sensation of fullness. After lasting for a week the symptom suddenly subsided, but a quantity of pus appeared in the urine, this gradually lessened but did not altogether disappear. About twelve days before admission he became all at once chilly, then feverish and had pain in the right loin. The urine was high coloured and scanty, the skin very hot and dry. The bowels were confined. He therefore came to hospital. At that time he was thin but wiry and slightly anæmic. The hair was white, and all teeth were absent. Temperature was 105° , pulse 86 per minute, regular but full and bounding, the arteries felt enlarged. Pain was felt in the right loin shooting to the groin, but no retention of testis present. The right kidney could be felt enlarged and tender on pressure, the enlargement was slight and no fluctuation could be felt; nor was there any abnormal appearance. The tongue was enlarged, fissured and much furred, the bowels confined, some nausea but no vomiting was complained of; liver and spleen were not enlarged. Burning pain was felt during micturition, the urine was 1016, and straw-coloured and without pus. The quantity was about normal, a small quantity of albumen was present. All the systems appeared normal. On the 16th the temperature was 102° in morning, but fell below normal in the evening. On the 17th it was normal. On the 18th he had another rigor, and temperature nearly reached 103° but fell next day. Considering the symptoms, I decided to operate. I asked Major Quicke to operate and I assisted, Dr. Lyons being also present. The incision was made in the lumbar region behind, the kidney was

partially separated, and brought out for examination. An incision was made in the convex margin into the pelvis, about an ounce of very offensive pus escaped; a careful examination was then made. After the enlarged ureter had been further exposed by enlarging the incision, it was suggested by the operator, whilst I passed a long probe down it from the kidney and detected a calculus at a distance of 4-5 inches, the ureter was then carefully compressed from below upwards, with the result that the calculus appeared at the opening above. The stone was black, oval and smooth, about the size of a small bean, and no other stone could be detected. A rubber and also a gauze drain was passed into the kidney incision part and which was closed by suture. The skin was then sutured and dressings applied. Next day patient's condition was fairly good, pain was slight, urine measured 10 oz, and contained some crystals of uric acid but no blood. At first the old man did well, though the temperature was high until evening of the 26th, when it fell but remained about 100° until November 30th, when it went up to 103°. There was, however, slight delirium at times, especially towards and during night. The parts appeared weak, and after some sutures were removed gaped widely, all the sutures were then taken out and gauze was introduced; the kidney was granulating, but the granulation were weak. On the 1st December a canula was passed into the kidney to see if pus was retained anywhere. Delirium and weakness gradually increased, and the patient died on December 8th. It appeared to me that the best course would have been to remove the kidney either at time of operation or later, but after consultation, it was thought that, owing to age and apparent debility, this would be too severe. I, however, had had the advantage of knowing the patient for many years in my own service, and that he was an exceedingly wiry Marhatta, and from the way he struggled to live I now think that he could have borne the operation, though at the time I was doubtful; evidently septicæmia was the cause of death, and as there was no reason to suppose that the left kidney was unsound, the removal of the right one might have been safely accomplished.

THE TREATMENT OF GONORRHOEA BY INJECTIONS OF COCAINE AND NITRATE OF SILVER.

By H. HAMILTON,
 LEUT.-COLONEL, I.M.S.,
 1/3 Gurkha Rifles, Almora.

A SHORT time ago a Gurkha came to hospital with a discharge of thick creamy pus from the urethra. He said he had had it for two days. This was probably an under-statement. I had him injected with a solution of cocaine 4 per

cent. and afterwards with a solution of nitrate of silver 4 grains to the ounce. There was no pain. He was injected the next day and the day following in a similar manner—three or four injections in all—and was then practically cured. Wishing to see if there was any discharge, I pressed the penis somewhat too forcibly causing a little blood to appear, and this caused a little further discharge which necessitated a further injection or two. He was discharged from hospital on the tenth day, having been kept in hospital some days after all discharge had disappeared. Since then a patient in hospital was found to have a discharge from the urethra and was treated in the same manner, and cured in the same quick way. Two swallows don't make a summer, and the result of treatment in two cases of gonorrhœa does not prove very much, but the fact remains that I never saw recovery occur so soon in two cases of gonorrhœa. I did not mean to make any report on the subject till I had had more experience, but it so happens just now that while I am having heaps of cases of syphilis in every stage and of every variety, I am getting no cases of gonorrhœa. I am therefore publishing this in the hope that others with larger opportunities may test the treatment and vary it and give us the results of their experience. I am sure the idea must have occurred to others, but I have never seen any account of it before.

INTERESTING CASE OF FRACTURE OF THE SKULL.

By AMBICA CHARAN DUTTA,
 Assistant Surgeon, Berhampur Municipal Hospital.

THE body was examined on the 20th February 1900, at 3 P.M., just 24 hours after death. Rigor mortis was marked in all the parts; abdomen enormously distended; urine coming out in drops; pupils equal.

There was a lacerated wound on the vertex 2½ inches long, gaping ½ inch wide, having the bone exposed underneath. It extended from 2½ inches above the left eyebrow in a direction upwards and inwards terminating about an inch from the sagittal suture. An extensive subcutaneous hæmorrhage spread from the position of the wound on the right side to the squamoparietal suture.

On dissection two parallel lines of fracture could be made out on the frontal bone, all parallel to the coronal suture and the one nearer to the suture was 1 inch long with serrated margins, and the other more remote was 3 inches long crossing the scalp wound at about its middle. Another stellate fracture was situated on the left parietal bone, the centre of radiation being the parietal eminence, the radii four in number and none less than 2 inches in length. The coronal suture on the right side was unusually separated.

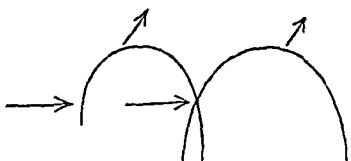
On taking out the skull-cap an extensive extradural blood clot was detected on the right side about $\frac{1}{2}$ inch thick covering the outer surface of the frontal parietal and temporo-sphenoidal to be of the corresponding side.

Nothing abnormal detected in the thorax. The stomach was distended partly with food and partly with gaseous contents. The food consisting of rice and *dal* gravitated to the cardiac end which on being raised allowed escape of the contents into the peritoneal cavity through an aperture situated there. No sign of adhesion or inflammatory effusion could be discovered. That portion of the stomach which contained the residual food presented an anæmic and necrosed appearance, mucous membrane ulcerated resembling in miniature the funnel-shaped ulcer which occurs in life, rest of the stomach presented healthy rugæ and all appearance of a normal organ. The bladder was full of urine.

The interesting features of the case are the following:—

- (1) Fracture of the frontal bone almost at right angles to the direction of the scalp wound.
- (2) Stellate fracture of the parietal bone of the same side which was not at all involved in the wound.
- (3) Extradural hæmorrhage undoubtedly from the middle meningeal on the opposite side.
- (4) *Post-mortem* digestion of stomach at the cardiac end causing it to perforate.

It is undoubted in the present case that all the cranial lesions were the result of one blow, fractures and hæmorrhage all indirect effect of the latter. The usual explanation for such indirect fracture do not hold good here. The man was standing while he received the blow, no part of his head was fixed. We can explain it better, I suppose, by considering one-half of the vertex to be composed of segments of two differently formed ellipses, anterior and posterior, having their longest axis terminating at the frontal and parietal eminence respectively, the segments cutting one another at the tangential line drawn through the coronal suture like that represented in the figure, and the effect of blow on one part would be to bulge out the ellipsis at their greatest curvature.



In conclusion I thank Major Walsh, I.M.S., the Civil Surgeon of Murshidabad, for allowing me to publish this case.

EXTRACTS FROM FOREIGN MEDICAL JOURNALS.

Protargol in ophthalmic practice.—Girard (*Thèse de Nancy*, No. 27 of 1899) gives the following reasons for preferring protargol to the nitrate of silver.

Protargol is not caustic; not painful; not liable to do more than is intended. When applied to the eye, antiseptic; and penetrates the tissues far better than the nitrate, which he calls "a two-edged sword, apt to do as much harm as good."

Iodine in cervical metritis.—In the *Gaz. Hebdomadaire de Méd. et de Chir.*, No. 42 of 1899, Max Carrière reports that he has had excellent results after applying the following mixture plentifully to the cervix, fornices and vagina, the application being repeated every three days.

B. Tinct. Iodi (Cod. Gall.) } Partes æquales.
Glycerini neutral

He explains the action of the iodine as being antiseptic and "antitoxic" in that it neutralises the toxins, produced by the discharge, which paralyse the phagocytes, and also the iodine being volatile, penetrates the tissues and causes a favourable lymphatic reaction, which promotes the growth of young and healthy cells.

However this may be, this method is worthy of trial if only because of the difficulty of curing cervical metritis by other means.

Are gargles efficacious?—In the *Münchener med. Wochenschrift*, No. 8 of 1899, Säuger reports his experiments towards the elucidation of this point.

He applied a solution of methylene blue to the tonsils, and then ordered gargles of plain water. In every case the water was ejected uncoloured, while the tonsils and posterior wall of the pharynx were coloured blue.

Again he touched the posterior third of the tongue and the velum palati with the dye, leaving the tonsils untouched. In every such case the gargle water became strongly blue.

In some cases he found that when the tonsils were dyed, the gargle water was very faintly tinged. This fact he believed is due to the air, expired during the act of gargling, detaching the mucus, tinged with the dye, from the tonsils.

This mucus is deposited on the velum palati, as can be proved by touching the tonsils with the dye and then ordering the patient to do a "dry gargle."

To check the results obtained Säuger sprinkled starch on the tonsils, velum palati and base of the tongue, and then ordered the patient to gargle with a solution of iodine in pot. iod. and glycerine. The result was that the tongue and palati became blue, while the tonsils remained uncoloured.

He concludes that gargles are of no use in anginas—where actual touching of the tonsils with the medication alone can do good.

The treatment of corneal infection in the new-born.—The only means of curing a corneal abscess or ulcer is to arrest the secretion of pus as soon as possible.

In the new-born our means of doing this are limited, for the galvano-cautery is not as effectual as it has been stated to be.

If the ulcer or abscess be but slightly marked one may instil a 1—500 sol. of methylene violet 6B (such as is used in bacteriology). If the base of the ulcer be raised and transparent, indicating that the membrane of Descemet is laid bare, this base should be lightly scratched with a needle, to allow of the escape of the aqueous, after the instillation of eserine.

When once the purulent secretion has become diminished one irrigation in the day is enough, and when there is any little secretion a solution of arg. nit. 1% (or protargol) should be instilled in preference to irrigation.

W. D. SUTHERLAND.

THE
Indian Medical Gazette.

SEPTEMBER, 1900.

THE LIVERPOOL TROPICAL SCHOOL.

THE Thompson Yates Laboratories were presented to University College, Liverpool, through the generous munificence of the Revd. S. A. Thompson Yates, and were opened in October 1898 by Lord Lister, F.R.S., who was accompanied by Professor Virchow and other distinguished men at the inaugural ceremony. They are devoted to teaching and research in physiology and pathology, and are under the general superintendence of Professor Rupert Boyce. The Laboratories adjoin the University, College and form an imposing block, being constructed of Liverpool grey bricks and Ruabon terra-cotta material. The School of Physiology under Professor Sherrington, F.R.S., occupies the first and second floors. There are separate rooms for chemical, physical and electro-physiology, and histology, with large and small theatres, photographic room, room for experiments on vision, aquarium, preparation room, private research rooms, &c. In all the lighting arrangements, natural and electric, are perfect. The equipment is very good. It includes, besides the ordinary apparatus for experimental demonstrations, an excellent pendulum myograph recording in thousandths of a second, heliostat apparatus, and complete fittings for lantern illustration—projection microscope, chromoscope, animatograph, episcopes and skiopticon—also very perfect arrangements for the projection of the spectrum. The Pathology School and Museum occupy the ground-floor and basement and are under Professor R. Boyce. There are rooms for morbid histology, private experiment, chemical pathology, and the bacteriological laboratory is a particularly fine large room. Here, as elsewhere, the working tables are covered with impervious opaline tops, diminishing the risk of contamination and facilitating cleansing; steam is used for boiling operations and electricity for lighting, &c. There is a special high-pressure water-supply, also a large refrigerator chamber worked by compressed ammonia, and a very large centrifuge worked by an electric motor.

The Liverpool School of Tropical Medicine was opened in April 1899, has its home in the Pathological Section of the Thompson Yates Laboratories, and is worked in connection with University College. Major Ronald Ross, I.M.S. (*retired*), is lecturer, and Dr. Annett, demonstrator in Tropical Diseases. The Professors of Pathology (Boyce), Zoology (Herdman), and Hygiene (Hope), also give instruction. The syllabus is so arranged that instruction can be obtained under four headings—(1) Private research; (2) a special course for missionaries and planters (three lectures on the elements of tropical disease and hygiene); (3) a special course for nurses, lasting two months; (4) the general course intended for students of medical parasitology, medical men, veterinary surgeons and fifth-year students. It comprises practical instruction, lectures and a final examination with certificate (if required). This certificate states that the holder of it has attended a course of instruction in tropical medicine, tropical hygiene, parasitology and bacteriology, and also in clinical practice in the Tropical Ward of the Royal Southern Hospital. For the purpose of clinical instruction a ward of fourteen beds is set apart in the Royal Southern Hospital for cases of tropical disease. In 1899, 176 cases in all were treated there, of which 152 were malarial fever cases, two malarial neuritis, three black-water fever, five dysentery, three sprue, one diarrhoea, one Malta fever, five beri-beri, two hepatic abscess, one scurvy, and one bilharzia; of these six died. The nationalities were very varied. There are two clinical laboratories attached to the Tropical Ward, containing microscopes, incubators, reagents, &c., for research. The laboratory of the Tropical School, situated, as already mentioned, in the Pathology Section of the Thompson Yates Laboratory, is as well fitted up and equipped as the pathological laboratories already described. There is also a fine collection of specimens, macro- and micro-scopic, of most tropical diseases and their parasites. The two great advantages possessed by the Liverpool Tropical School are, first, the considerable amount of clinical and pathological material available, and secondly, its association in the same building with the Schools of Physiology and Pathology. The value of having experts distinguished in their special subjects at hand to consult and to advise the worker is considerable.

The first two volumes of the Thompson Yates Laboratory Reports have been issued and furnish ample evidence of the excellent work being done there. They are edited by Professors Boyce and Sherrington and are beautifully got up and illustrated. They contain many valuable monographs by workers in the School, in Neurology, Bacteriology and Pathology, and have two supplements, one on 'Oysters and disease' by Herdman and Boyce, and the other the 'Report of the Malarial Expedition to West Africa' by Ross, Annett, Austen, Giles and Fielding-Ould, the contents of which have already been given in these columns.* A 'yellow fever commission,' composed of Messrs. Durham and Myers, is just about to be sent to South America by the School, and it is hoped they may be able to solve some of the difficulties surrounding the subject. In an introductory note to a paper by Dr. A. S. Grünbaum, it is clearly established, on the authority of Professors Boyce, Sherrington, Nothnagel and Mannaberg, that Grünbaum discovered the agglutination of typhoid bacilli by the serum of enteric fever cases *three months before* Vidal's first publication. Vidal himself has so far failed to make any acknowledgment of this,

and it seems only fair to Dr. Grünbaum to draw attention to it as publicly as possible. The Liverpool School is unfortunate in this respect, as it was only in 1898, as readers of the *Indian Medical Gazette* may remember, that we had to point out the scanty acknowledgment given to Major Ross's work by Drs. Grassi, Bignami and Bastienelli when they published researches based almost entirely upon his, though put forward as original.

The number of workers in the Tropical School has so far not been large, but when the Colonial Secretary sanctions the recognition of the School as one where Medical Officers about to enter the Colonial service may undergo the necessary course of instruction, as it is hoped he soon will, the numbers are sure to increase. It would be well if men who have been so trained could be attached for a couple of months to one of the large hospitals in the colony or dependency to which they go before starting practice in the tropics.

* There are three papers on the bacteriology of plague and Haffkine's plague prophylactic by Dr. C. Balfour Stewart.

THE INCREASE OF TUBERCULOSIS IN THE JAILS OF INDIA.

RECENTLY, in commenting upon Dr. Crombie's statement that tubercle of the lungs seemed on the increase in Indian jails, we observed that, in our opinion, some of this increase was due to increased accuracy in diagnosis or rather to

increased care in returning cases of chronic diarrhoea, &c., under their proper cause, *viz.*, tubercle. Since then we have been able to make a more complete examination of this question, with the result that, as shown in the following table, there must be admitted to be a very considerable increase in the number of cases of tuberculosis in jails during the past decade.

NINE YEARS' ADMISSIONS FOR TUBERCLE OF THE LUNGS IN INDIAN JAILS.

(Admissions to hospital per mille of strength.)

Year.	Andamans.	Burma.	Assam.	Bengal.	N.-W.P.&O.	Punjab.	Bombay.	Borai.	Cent. Prov.	Madras.	All India.
1899 ...	10.3	9.5	3.8	10.8	6.7	6.6	5.1	2.1	2.9	10.8	8.1
1898 ...	7.2	7.2	1.6	9.1	7.2	7.2	5.2	5.6	5.9	15.2	7.8
1897 ...	5.3	5.9	3.2	7.6	6.4	5.8	7.1	4.7	5.8	15.3	6.9
1896 ...	6.5	7.8	5.5	7.3	6.0	4.7	9.9	1.4	9.1	14.0	7.2
1895 ..	3.1	5.6	1.7	7.5	4.2	5.5	7.8	4.9	5.0	9.0	5.5
1894 ...	...	5.6	.8	7.4	3.9	3.2	1.1	...	.7	4.9	3.9
1893 ...	...	5.8	...	6.8	3.3	3.9	.8	.7	1.4	4.4	3.7
1892 ...	.1	4.2	...	4.7	3.5	3.5	1.1	1.6	.6	3.4	3.0
1891 ...	1.0	2.2	...	3.7	3.7	2.4	1.0	...	1.5	2.5	2.6

The preceding table suggests several considerations, while the fact of a very real increase is plain to see, yet a glance at the columns giving the ratios, for the Andamans, Berar, and Assam especially, shows that it is scarcely probable that all this increase is due to a positive increase in the disease. *E.g.*, it is improbable that there was no phthisis in the Andamans in the years 1892-93-94, or in Assam during the same period. On the other hand, the steady and progressive rise in the disease is only too apparent, and is a fact which must be faced by all medical officers.

Another important point to be noted is the steady increase in the number of prisoners in Indian jails. In 1891 the total convict population of all India was 101,019 contrasted with 110,016 in 1899 (and 118,107 in the year 1897). We have not at hand sufficient data to be able to state that in the past nine years there has been an increased accommodation in the jails of India to meet this largely increased population; but our impression is that the increased accommodation to this extent has not been provided, hence if this is the case, more prisoners have been confined in the same space than was the case a decade ago. There can be no doubt whatever that now-a-days overcrowding is not an uncommon occurrence in the jails of many provinces, and very strict rules exist for the avoidance of this often inevitable occurrence, which is clearly recognised as a defect.

We say we are compelled to look upon a large amount of this increase in the number of cases of tubercle as indicating a positive increase in the disease, and therefore are bound to search for a cause of this increase. Dr. Crombie has shown why phthisis is apparently not so common among the general population of India as in some other countries; but we must remember that statistics of the general population for this disease do not exist, and we are compelled to use the accurately prepared and elaborate statistics which do exist for two classes of the native community, *viz.*, sepoys and convicts.

As regards sepoys it is well known that they are picked men in the prime of life, and consequently will not fairly represent the general population. In certain regiments, the Goorkhas, for example, much has been made of a certain racial proclivity to the disease, but from some recent information which we received we are inclined to believe that the proneness of Goorkhas to tubercle is more likely due to local insanitary

conditions, chiefly the cramped and crowded condition of their regimental lines, and the want of sufficient ventilation on account of this crowding, and from the habit all inhabitants of India have of shutting up doors and windows when the outside air is too cold, as it often is in hill stations where Goorkhas live. The Goorkha soldier has also brought this bad habit with him from his hut in the hills of Nepal.

It has of late been frequently stated that natives of India are to a large extent immune to phthisis. This we have more than once pointed out is far from the actual fact, and, years ago, Allan Webb, Goodeve and William Moore, called attention to the large amount of phthisis which was to be found among natives attending the public hospitals of India. To what an extent this is true we shall never know till accurate and less vague statistics of disease are returned from all civil hospitals and dispensaries.

As regards jails, however, there can be little doubt but that this disease is on the increase and is a great cause of mortality. How great, is shown by the following facts: Out of 21,841 deaths from all causes in the prisons of India in the seven years 1893 to 1899, we find no less than 2,254 deaths from tubercle of the lungs (and phthisis) alone, excluding all other forms of tuberculosis, that is to say, one death in every nine (one in nine) is from tubercle of the lungs. This rate is higher than it is even in England, where we find from the 16th Annual Report of the Registrar-General, that 76,903 deaths to one million from all causes are due to phthisis, that is, only one death in every thirteen. It may surprise many to find that the Indian rate for this disease, which has been called the "white man's plague," is higher than that of England.

It is clear, therefore, that it behoves the medical officers of jails to devote very special attention to the prevention and treatment of tubercle cases according to modern methods. We have tried the open air treatment of phthisis in Bhagalpur jail with some success, and we recommend the attempt being made. The chief point to attend to after an early diagnosis has been made are, of course, isolation, disinfection of sputum, free ventilation of sleeping ward, flannel clothes, and plenty of nourishing food. The patient when he has fever should sit out on his bed in the open air, with suitable clothes, under a tree for most of the day, or in a verandah

in the rains; and when free of fever should be made to take regular graduated walking exercise morning and evening.

We call the attention of the medical officers of jails in India to the above table. Once they realise the fact of the increase of tuberculosis they will take steps to meet it.

LONDON LETTER.

WAR HOSPITALS SCANDAL.

SUCH is the formula which, during the last week has taken the most prominent position in the posters which announce the contents of the daily papers. It is a rude awakening. Up to then the British public had been living in a 'fool's paradise, comforting itself with the belief that whatever mistakes have been made in the prosecution of the South African War two departments, the Army Service Corps and the Royal Army Medical Corps, have rendered admirable and effective service and performed the important work of ministering to the sustenance of the army and the relief of the sick and wounded as well as under the circumstances of the campaign it could possibly be done. Mr. Burdett-Coutts, M. P. for Westminster, best known as the husband of the aged and philanthropic Baroness Burdett-Coutts, is responsible for having opened the eyes of the public and presented pictures of neglect and suffering which have shocked the nation and touched the hearts of people who have relatives and friends at the front—and their name is legion—on the tenderest spot. Mr. Burdett-Coutts' revelations appeared in the *Times*.

Accredited by that paper, which has since the commencement of the war had a severely critical eye on the hospitals, he proceeded to South Africa, and made it his business to observe the treatment of the sick and wounded. Among other places visited by this gentleman was Bloemfontein, and this visit took place at a time when the resources of the medical department were strained almost to breaking by the severe outbreak of enteric fever which occurred after Lord Roberts' celebrated march, and in consequence of the conditions encountered during that arduous operation. There can be no doubt that the incidents and scenes described by Mr. Burdett-Coutts were actually witnessed and truly described by him. The fever-stricken, numerous beyond all reasonable anticipation, had to be

accommodated and treated in field hospitals and tents, and for a time attendants and appliances were insufficient and perhaps inefficient. The matter is to become the subject of special inquiry, and a final judgment on the merits of Mr. Burdett-Coutts' accusations must be suspended. The questions that arise are—Was there reason to anticipate so sudden and extensive an outbreak of enteric fever? Could arrangements have been made under the circumstances to meet the contingency? Were agents and appliances forthcoming in sufficient abundance and of proper quality to grapple with the emergency when it did arise? If default existed, was that the outcome of a faulty system or the result of culpable error or shortcoming of any department, authority or individual? Mr. Burdett-Coutts is careful to acquit Lord Roberts and Officers of the Royal Army Medical Corps of blame in the matter, and throws the onus of failure on the system which, he contends, is too much bound and fettered by red-tape and not devised upon sufficiently generous and progressive lines, more especially as regards skilled nursing and comforts.

WAR IS WAR.

This is practically the apology of the War Office for the hardships which the sick and wounded have had to sustain. Suffering is inevitable in war, more especially during operations such as those which Lord Roberts conducted when he advanced rapidly on two occasions into the heart of a hostile country—taking risks which subjected his army to unavoidable exposure, to influences and conditions imperilling health and life, banishing comfort and excluding the amenities and humanities of ordinary existence justifiable only by compulsion and success.

The loss of health and life and the hardship and suffering sustained were the price paid for the success attained, and this was substantial and undoubted. But apart from this view which though sound enough is of an *à priori* character, apologists who have had equal opportunities of observation, and equal if not superior power of judging, have come forward to testify that in this war, which we may reasonably hope is now nearly ended, the medical department, official and non-official, has acquitted itself admirably and done all that could be done to succour the sick and wounded. Sir William MacCormac, Mr. Treves, Sir William Stokes and many other

medical men who have been intimately concerned in the management of hospitals and treatment of those disabled by disease and injury have given strong and warm evidence to this effect. The results of treatment are also very favourably represented by the case mortality of diseases and wounds. It would be absurd to deny that the experience gained in this war has not revealed defects, and suggested improvements, and good will undoubtedly come of a searching inquiry if judiciously conducted by competent persons.

K. M'L.

Current Topics.

ANTITYPHOID INOCULATIONS IN INDIA IN 1899.

WHILE from information to hand we have to admit that antityphoid inoculations have been of little or no use in preventing typhoid fever in the Army in the field in South Africa, we are glad to be able to give the following figures as the results of last year's (1899) inoculations in India. They are very favourable, and in fact almost identical in their results with those published by Professor Wright in the *Lancet* in January last.

TABLE.
Indian Army (E. T.) 1899.

No. of men inoculated.	No of men not inoculated.	CASES OF ENTERIC FEVER.				PERCENTAGE TO STRENGTH.			
		Among Inoculated.		Among Non-Inoculated.		Inoculated.		Non-Inoculated.	
		Ad.	D.	Ad.	D.	Ad.	D.	Ad.	D.
4,502	25,851	41	9	657	146	·98	·2	2·54	·56

The following figures give the statistics of enteric in India for 1899, irrespective of inoculation. Total strength, British troops, 67,697, admissions for enteric 1,312, deaths 348, or the very high death-rate of 25 per cent. The ratio of admissions to total strength was 20·6 per mille. The above figures for inoculations include those given by Professor Wright in his *Lancet* article, but are for the whole year, and give a much larger total of men inoculated. The incidence of the disease is however the same as in Professor Wright's paper, *viz.*, among those inoculated less than one (·98) man per hundred was attacked, while among the non-inoculated 2·5 men were attacked, or a relation of about 2 to 5.

What the full explanation is of the considerable fall in the admission rate for enteric in 1899

from 36 in 1898 to 20 per mille in 1899, it is so far impossible to say. The high rates for 1897 and 1898 (see *Indian Medical Gazette*, June, p. 221) are explained by the number of troops upon field service on the frontier in those years, but this does not explain why the 1896 ratio was 30 per mille, while in 1899 it was only 20. We wish we could attribute it to the influence of the great care and attention now paid to the various factors in the causation of enteric.

TYPHOID FEVER AND WAR.

IN view of the appointment of a Commission by the Houses of Parliament to inquire into the causation of the great prevalence of typhoid fever among the troops in South Africa, it is interesting to note the conclusions arrived at by a similar Commission appointed for a similar purpose by the United States Government after the War in Cuba in 1898. We quote the conclusions as given in a public oration by Professor Victor C. Vaughan of the University of Michigan (*Journal of American Medical Association*, June 9th, 1900, p. 1451).

(1) Every regiment in the United States service in 1898 developed typhoid fever.

(2) More than 90 per cent. of the volunteer regiments developed typhoid fever within eight weeks after assembling in the State encampments.

(3) Most, probably all, of the regular regiments developed typhoid fever within less than eight weeks after going into camp.

(4) Typhoid fever not only appeared in every regiment in the service, but it became epidemic, both in small encampments of not more than one regiment, and in the larger ones consisting of one or more corps.

(5) Typhoid fever became epidemic in camps located in Northern as well as in those located in Southern States.

(6) Typhoid fever is so widely distributed in this country (United States) that one or more cases are likely to appear in any regiment or similar body of men within eight weeks after assembling.

(7) Typhoid fever usually appears in military expeditions within eight weeks after assembly.

(8) The miasmatic theory of the origin of typhoid fever is not supported by our investigations.

(9) The pythogenic theory of the origin of typhoid is not supported by our investigations [nor is it disproved.—*Ed., I. M. G.*]

(10) Our investigations confirm the doctrine of the specific origin of typhoid fever.

(11) With typhoid fever as widely disseminated as it is in this country (United States), the chances are that if a regiment of 1,300 men should be assembled in any section, and kept in a camp, the sanitary conditions of which were perfect, one or more cases of typhoid would develop.

(12) Typhoid fever is disseminated by the transference of the excretions of an infected individual to the alimentary canal of others.

(13) Typhoid fever is more likely to become epidemic in camps than in civil life, because of the greater difficulty of disposing of the excretions from the human body.

(14) A man infected with typhoid may scatter the infection in every latrine of a regiment *before* the disease is recognised in himself.

(15) Camp pollution was the greatest sanitary sin committed by the troops in 1898.

- (16) Some commands were unwisely located.
- (17) In some instances the space allotted to regiments was inadequate.
- (18) Many commands were allowed to remain on one site too long.
- (19) Requests for change in location made by medical officers were not always granted.
- (20) Superior line officers cannot be held altogether blameless for the insanitary conditions of the camps.
- (21) Greater authority should be given to medical officers in matters relating to the hygiene of camps.
- (22) It may be stated in a general way that the number of cases of typhoid fever in the different camps varied with the method of disposing of excretions.
- (23) The tub system of disposal of faecal matter as practised in the second division of the Seventh Army Corps is to be condemned.
- (24) The regulation pit system is not a satisfactory system of disposing of faecal matter in permanent camps.
- (25) Our board has recommended that in permanent camps, where water carriage cannot be secured all faecal matter should be disinfected, and then carted away from camp.
- (26) Infected water was not an important factor in the spread of typhoid in the national encampments in 1898.
- (27) Flies undoubtedly served as carriers of the infection.
- (28) It is more than likely that men transported infected material on their persons, or in their clothing, and thus disseminated the disease.
- (29) Personal contact was undoubtedly one of the means by which the infection was spread.
- (30) It is probable that the infection was to some extent disseminated through the air in the form of dust.
- (31) A command badly infected with typhoid does not lose the infection by simply changing its location.
- (32) When a command badly infected with typhoid changes its location, it carries the specific agents of the disease in the bodies of men, in their clothing, bedding and tentage.
- (33) After a command becomes badly infected with typhoid, change of location, together with thorough disinfection of clothing, bedding and tentage, is necessary.
- (34) Even an ocean voyage does not relieve an infected command of its infection.
- (35) Except in case of most urgent military necessity one command should not be located on a site recently vacated by another.
- (36) The fact that a command expects to change its location does not justify neglect of proper policing of the ground occupied.
- (37) It is desirable that soldiers' beds should be raised from the ground.
- (38) In some encampments the tents were too much crowded.
- (39) Medical officers should insist that soldiers remove their outer clothing at night, when the exigencies of the situation admit.
- (40) Malaria was not a prevalent disease of the troops that remained in the United States.
- (41) The continued fever that prevailed among the soldiers in this country in 1898 was typhoid fever.
- (42) While our investigations show that coincident infection with malaria and typhoid may occur, the resulting complex of symptoms does not seem to be sufficiently well defined and uniform to be recognized as a separate disease.
- (43) About one-fifth of the soldiers in the national encampments in the United States in 1898 developed typhoid fever, i.e., out of 44,803 officers and men there were 9,660 cases of typhoid (21.5 per cent.).
- (44) Army surgeons correctly diagnosed less than half the cases of typhoid fever.
- (45) The percentage of deaths among cases of typhoid was about 7.5 per cent.

- (46) When a command is thoroughly saturated with typhoid it is probable that from one-third to one-quarter of the men will be found susceptible to the disease.
- (47) In military practice typhoid fever is often apparently an intermittent disease.
- (48) The belief that errors in diet with consequent gastric and intestinal catarrh induced typhoid fever is not supported by our investigations.
- (49) The belief that simple gastro-intestinal disturbances predispose to typhoid fever is not supported by our investigations.
- (50) More than 80 per cent. of men who developed typhoid had no preceding intestinal disorder.
- (51) The deaths from typhoid were more than 80 per cent. of the total deaths.
- (52) The shortest period of incubation in typhoid is probably something under eight days.
- (53) One who has lived in a camp in which typhoid fever is prevalent is liable to develop the disease any time within eight weeks after leaving such a camp.

Several obvious criticisms may be applied to the above report, for instance, when he discusses the theory of Major A. M. Davies, R.A.M.C., that the typhoid bacillus may be developed by evolution from bacillus coli or such germs. Of course if it is proved that typhoid was introduced from without in the American camps, *cadit questio*, but it seems too much to assume this without any proof. At any rate it does not invalidate or even affect the evolution theory. Moreover, Dr. Vaughan mentions the prevalence of diarrhoea in May to August, and it is said that the diarrhoea gave a certain degree of immunity in August—if this is so it supports Major Davies' evolution theory. Another point may be noted, *viz.*, the very low case—mortality, *viz.*, only 7.38 per cent.—this for camp typhoid looks as if a large number of the cases were not typhoid at all. Recent experience in India points strongly to a revival of Murchison's pythogenic theory of typhoid, or rather the evolution of the germ from bacilli of the coli type owing to faulty latrine, &c., arrangements. For an exposition of this view of the origin of enteric in India, the reader is referred to the admirable *Handbook of Hygiene* by Major A. M. Davies, R.A.M.C.

THE BENGAL MEDICAL LIBRARY.

WE have already referred to the Library for the use of medical officers in Bengal which is being started in the office of the Inspector-General of Civil Hospitals, Bengal. For its being thrown open for the use of medical officers they are indebted to Colonel T. H. Hendley, C.I.E., I.M.S., who had also persuaded the Government of Bengal to liberally support it. We have just received the catalogue in two volumes of this Library, a perusal of which will show the large number of valuable medical works and reports which it contains. Such a Library is a long-felt want in India and cannot fail to be useful. We commend this admirable move of Colonel Hendley to other Administrative Medical Officers in other provinces, where the neces-

sity of such a Library is as great as it was in Bengal.

THE OUTBREAK OF CEREBRO-SPINAL FEVER AT KHARTOUM IN 1898-99.

OUR readers may remember that attention was called in these columns to the outbreak of cerebro-spinal fever which occurred among the Soudanese troops shortly after Lord Kitchener's occupation of Omdurman. An interesting report on this outbreak by Capt. H. E. H. Smith, R.A.M.C., appears as an appendix to the A. M. D. Report for 1898 (p. 567). That a malignant disease, commonly called typhus, was generally prevalent in Khartoum is known to all readers of Slatin Pasha's "*Fire and Sword*." Shortly after the occupation a new battalion was raised, the 15th, from among the Dervish prisoners captured at the battle of Omdurman. In November several cases of fever (of course called, at first, enteric) appeared in this regiment, but the autopsies soon revealed that the disease was cerebro-spinal meningitis.

It was also found that a mysterious disease had broken out among the Dervish horses before the occupation; and 125 horses had died in the very houses now occupied by the 15th Battalion. One Hassan Zeki, a former medical officer of the old Egyptian army, and long a prisoner in Khartoum, stated that the Dervishes had brought the disease with them when they came in hordes to take part in the fall of Khartoum in Gordon's time. This disease, thought to be typhus, had persisted in Khartoum since then. Hassan Zeki attended the Madhi in his fatal illness, which was not typhus as usually stated, but cerebro-spinal fever. Lupton Bey was another victim, and the Khalifa narrowly escaped from an attack.

The history of this outbreak is interesting. On the 26th October 1898, the 15th Regiment occupied the stables, and on the 6th November the first case appeared. These stables had been previously occupied as quarters by the body-guard of the Khalifa's son, but owing to an outbreak, of probably this disease, they had been evacuated and turned into stables, the horses then died, and the premises were again evacuated till the 15th Soudanese again occupied them and suffered from the disease. This is important evidence as to the clinging of infection to the buildings: when 19 deaths out of 29 cases had occurred the 15th were removed, but deaths still occurred, as the men continued to visit the Hareemat lines, or women's quarters, on the old site. The Hareemat was removed, and the houses destroyed, and after that only five more cases occurred in the regiment. These old lines were also overcrowded. On January 19th, the 10th Soudanese were attacked in their lines, only 400 yards from the first infected lines, then came the turn of the 9th. These regiments continued

to have cases also after removal into camp till the Hareemat was destroyed. It is noteworthy that no Egyptian regiment was attacked; they were encamped in quite a different direction. In February the 11th and 13th Soudanese, returned from Fashoda, were attacked to a slight extent. Meanwhile the civil population was attacked, and 42 cases were reported. Captain H. E. H. Smith, R.A.M.C., was sent up the Nile to visit certain villages and found numerous cases in them. The Dervish prisoners were also attacked, and a mysterious disease of goats appeared at the same time.

Cases admitted at the end of the epidemic showed a diminution in the severity of the symptoms. Among the troops there were in all 143 cases admitted, and of these 68 died. Besides this there were 11 cases among the Dervish prisoners, and 42 deaths were reported among the civil population. The symptoms of the disease as described by Captain Smith are quite characteristic of the disease as seen in India. No rash was noted among these cases except herpes labialis, just as is the case in India. The bacteriological examinations were, as might be expected under the circumstances, carried out with difficulty, but on his return to Cairo Captain Smith was able to find the *diplococcus intracellularis* in some specimens.

Some interesting cases are quoted which show that the incubation period of the disease may be very short, 52 or 76 hours.

This report is interesting from several points of view; it clears up the exact nature of the disease which has so long been endemic in Khartoum. It also shows that the infection may cling to the dust, and thus may be removed to another place on old mats or other building material. The original infection is probably in the sputum and nasal secretion, and it is noted that the Soudanese are inveterate expectorators. The probability is that the disease may also affect domestic animals, as horses and goats. The extremely contagious nature of the disease was most marked in this outbreak; this is a quality which has not been demonstrated in any outbreak in India.

CENTRAL ASYLUM AT BERHAMPUR.

It has finally been decided to abolish the Lunatic Asylums at Dullunda and Patna, and to construct by additions and alterations a Central Asylum at Berhampur to accommodate 700 patients. The Asylums at Cuttack and Dacca will remain as they are for the present, but it is most probable that when railway communication with Orissa is fully established the Asylum at Cuttack may be found no longer necessary. Apart from the fact that a convenient asylum is required for the insane of Eastern Bengal, there are certain sentimental reasons why we should regret the disappearance of the one at

Dacca. It is a very old institution, and was maintained by the Mahomedans before we took it over. Berhampur has been chosen partly on account of its reputation as a healthy asylum and partly because there is land available for extension of the present asylum. The Indian Asylums are lamentably behind those of the West, both in structural and managerial matters, and it is to be hoped that this opportunity may be made good use of and many necessary improvements introduced. The cost of the alterations and new buildings is estimated at something over two and-a-half lakhs of rupees. The new buildings will, we hope, have their floors and walls made of some smooth impervious material that can be washed and kept clean. As changes in the staff will be made it is high time that the warders were placed on a better footing. At present the pay is poor and does not attract a class of men of sufficient intelligence for the work. The management of lunatics requires not only kindness, though that is essential, but also a certain amount of special education. The men at present employed as warders are for the most part illiterate and not the material from which useful attendants could be evolved even with teaching. The men best suited for the higher grade—jemadars and head warders—would be up-country men of the class that become compounders or even hospital assistants, and to attract such men the pay must be very much higher than the new scheme contemplates. It is not too late, however, to put this matter right. For the rank-and-file to act as mere caretakers the present men may do but few if any of them would ever become fit, or even suitable for promotion to the higher grades. It has been wisely decided to give instruction in mental diseases, and the management of the insane at all asylums and a certain number of hospital assistants from Calcutta and Patna will be sent to Berhampur, while those recruited from the Medical Schools at Dacca and Cuttack will go to the asylums in those towns. This will necessitate the fitting up of a lecture-room and laboratory for practical work in each asylum, and it is to be hoped that a sufficient grant will be made for the purpose. The microscopes and appliances must be of the best or the labour will be in vain. What this initial expenditure is estimated at we do not know, but it is believed that when once started the up-keep of the teaching department will not exceed Rs. 400. This seems too small a sum when we go into details. It is proposed that Government should provide books for the students, and as regards expensive works of reference and manuals for use in the laboratory the idea is a good one; but every student attending the classes of instruction should be compelled to provide himself with a small handy manual such as that by Dr. Savage. This will form the nucleus of his work, to be expanded by

notes taken at lectures and by reference to larger and more expensive works. The students while attending this course of teaching, which is to occupy two months and to consist of twelve lectures with practical work in the wards and in the laboratory, are to receive Rs. 5 a month in lieu of quarters. We do not know how many terms of two months there are to be in the year, but allowing for three such terms and six students, let us suppose attending the Central Asylum, we arrive at Rs. 180 as spent on house rent, and this makes a large hole in the maintenance estimate. We are very much afraid that, when travelling allowance, cost of books, materials for preparing brains, stains, new apparatus to replace breakages, slides, cover glasses, ink, stationery and the many odds and ends, required in an efficient laboratory are added to the above-mentioned house allowance the budget will show a deficit. However a little money more or less will not we feel sure be grudged to forward such a praiseworthy scheme.

THE ANTI-MALARIAL INFLUENCE OF LIME.

RECENT researches on the origin of malaria have made us so hopeful of being able some day to do something to mitigate this pest of humanity that any observation tending in this direction is seized upon with eagerness.

The communication made some months ago by Dr. Roche, of Toucy, on the disappearance of paludism in Puisaye, backed as it was by the authority of Laveran, led Dr. Grellet to a discussion of the subject (*Revue D'Hygiene*, Vol. XXI, No. 8, 1899, Paris). He writes that after careful examination it is not possible to attribute this disappearance of malaria from the plateau of Chatillon-sur-Loing to any other cause than the incorporation into the soil of a certain quantity of lime used as a fertiliser.

The fertilisation of the soil was resumed in 1824, on the plateau after long cessation; in 1840 it was practised on all the estates on the plateau, and since 1840 the disappearance of the fever dates. This disappearance is not attributable to any known cause but the use of lime as a fertiliser. The ditches, ponds and all bodies of stagnant water are in their usual state, but they have ceased to be foci of malarial infection. The arable soil of Chatillon is clay superimposed on a conglomerate of silica and oxide of iron. The plateau overhangs at a height of 30 metres a damp marshy valley, of alluvial soil, and *a priori* most favourable site for malaria, but this valley has always been spared while the plateau suffered. This immunity of the valley is attributed to the lime which is mixed in large proportion with the soil by the attrition of calcarious rock.

To my own knowledge, writes Dr. Grellet, the liming of soil has been practised, in the interests of agriculture, in various provinces of

France, which were more or less affected with malaria. Since the practice has become general these provinces have become free of malaria; a result which he states is inexplicable on any other assumption than the influence of the lime on the soil.

Following out this line of inquiry, Dr. Grellet shows that there are countries which present all the conditions favourable to the development of malaria yet remain immune. He instances the salubrity of Lower Egypt and attributes it to the admixture of lime in the deposits of the Nile. In France the district of Beauce situated on calcareous soil on the right bank of the Loire is immune; while the region of Sologne, on the opposite bank, which is sandy and clayey, and very poor in lime, is strongly affected by malaria. On the channel coast of France the soil is calcarious and free from malaria; at the mouth of the River Loire lime is rare or altogether lacking, and malarial fevers make their appearance. In Algiers calcarious localities are free from malaria, which prevails all around them. The absence of malaria in Tahiti, New Caledonia, and many Polynesian Islands, a fact often commented upon by travellers, is attributed by Dr. Grellet to the fact that these are coral islands. He even says that the innocuousness of salt-water marshes is attributable to the action of lime and not to the saltiness of the water.

With regard to the quantity of lime to be used, it has been found that on the plateau of Chatillon 27,000 kilogrammes* of lime to the acre sufficed for agricultural needs and for the extermination of malaria. It may be noted that in the above article Dr. Grellet nowhere alludes to the mosquito theory, indeed he talks of "the telluric origin" of malaria, but his observations may, however, be explicable from this point of view. It is conceivable that puddles or such collections of water receiving the drainage of fields manured with lime might not be suitable breeding grounds for the malaria carrying mosquitoes. We cannot help thinking that Dr. Grellet has pushed his lime theory too far; it would be an interesting subject for a thesis to inquire how far the distribution of malaria in India coincided with an excess of deficiency of lime in the soil.

KOCH'S QUAIN'T VIEWS ON MALARIAL IMMUNITY.

Magni nominis umbra is a factor to be reckoned with in medical matters as well as in the affairs of the world at large, and nowhere has this been recently more conspicuous than in the mute unquestioning way in which Professor Koch's utterances on the subject of malaria have been received by the leading medical journals of London. Our readers will remember

the account of Koch's researches given in his third report to the German Colonial Office (*British Medical Journal*, May 12th, 1900).

The portion we wish here to particularly refer to is, Professor Koch's pronouncement on the subject of acquired immunity to malaria.

Professor Koch writes: "A further fact to be gathered from the tables which, as far as I know, has now for the first time been *ascertained in an incontrovertible manner* (the italics are ours) is the natural immunity which the inhabitants of a malarious region acquire in the course of a few years. Our researches in Java had already enabled us to recognise a gradually increasing immunisation; in two New Guinea villages we had quite a classic proof of this. In one village, among the inhabitants over five years of age, we found not a single one with malaria, though it was abundant among the children. I am perfectly convinced that in other malarious regions perfectly analogous conditions exist. . . . immigrants coming from non-malarious regions are in exactly the same position as children born in a malarious district."

The logical meaning of this statement, which Koch evidently means to be everywhere applicable, is that, among the natives of a malarial district, only children are affected with malaria, the adults are all immune. Could anything be more absurd? We may admit that children suffer from malaria very largely, but what of the hundreds of adult patients who attend every hospital and dispensary in India? Do they not suffer from malarial fever? What about the half million of people who are said to die in India yearly, directly and indirectly, from malaria? Is this half million made up of children only? Do adults never die or be ill from malaria, unless they leave their native homes and emigrate into other districts?

How can any one maintain the hypothesis that the "inhabitants of a malarious region acquire an immunity in the course of a few years"? If this were so, there would be no malarial fever in Eastern Bengal and Assam except among children or among immigrants into those districts.

Koch's method of proving that adults were immune to malaria is by an examination of their blood, and because he found no parasites in their blood *at the moment of the examination*, he concluded that they were immune to malaria. Even in the most malarious place, the majority of inhabitants at any given moment are not suffering from malaria, but this does not prove that they are immune altogether, and that they never will get fever.

THE CAUSATION OF BERI-BERI.

A NOTE in a recent issue of our contemporary, the *Pioneer*, referred to an interesting observation by Mr. Charles Hose, of the Sawarak Civil

* About 25 tons.

Service, who, having suffered from beri-beri himself, set himself to try to find out something of the cause of it. He puts forward the theory that beri-beri is due to the consumption of mouldy rice, in which some fungoid growth has grown. Some time ago we noted that a similar view was put forward by Dr. Tenbrink of Chicago. There is much to be said in favour of the dietetic origin of the disease, and its connection with rice has been frequently noted. The almost total disappearance of the disease from the Japanese Navy, when a more nitrogenous dietary was substituted for the former rice one, is the great fact in favour of this view. In our columns Captain Barry shows that in Rangoon the disease is very common among South of India coolies resident there, whose food is somewhat deficient in nitrogenous elements. On the other hand, a recent article (*British Medical Journal*, May 12th, 1900), Dr. F. Clarke, of Hong-Kong, reports an outbreak in the Berlin Foundling Home in Hong-Kong, where the Chinese children's dietary was a most generous one, and consisted of rice, eggs, fresh and salt fish, with beef or pork for dinner every day in the week. The outbreak of the disease in the Dublin Asylum (if it is the same disease) also could not in any way be traced to the dietary, which was the same as in many neighbouring institutions which did not suffer from the disease. We may also remember that Dr. Eikjman (*Janus*, August 1897) and Dr. Vordermann in his elaborate report to the Dutch Netherlands Government, maintained that the disease was due, not to rice *per se*, but to the use of well-cleaned white decorticated rice, whereas those institutions in which the red (non-decorticated) rice was used escaped entirely, and the issue of the red rice at once put a stop to outbreaks of the disease. In 1898, Dr. W. K. Hunter wrote an article in the *Lancet*, in which he claimed to have found the now discredited staphylococcus of Pekelharing and Winkler in the *cooked* rice provided for some lascars on board a ship lying at Glasgow, on board which were some patients suffering from beri-beri. We pointed out at the time the difficulty of accepting this observation, for it is not easy to understand how the germ could withstand the heat necessary to cook rice according to Oriental methods. The same objection holds good against the theory of Mr. Charles Hose. The rice may well have been mouldy, but Mr. Hose presumably did not eat it without thorough cooking.

Rice alone will not explain beri-beri. It is unknown among the rice-eating millions of Bengal. The only cases we know of in Bengal were among Chinese carpenters in Calcutta. We lately asked the question, if anyone had ever observed beri-beri among a wheat-eating people. We believe no such case has ever been known.

It is strange that while cases of beri-beri are not infrequently reported among lascars in ports

in Europe, we have never heard or seen any allusion to the occurrence of such cases among the lascars at either Calcutta or Bombay.

PYORRHOEA ALVEOLARIS OR SCURVY.

OUR readers may remember the discussion in our columns, last September, on the question of scurvy in the jails of India. Major Andrew Buchanan, I.M.S., of Nagpur Jail, raised the question and claimed that the condition of pyorrhoea alveolaris, so common at that time in certain jails, was due to scurvy, and produced by lack of vegetables. We challenged that opinion at the time, and this year we notice in the Central Province Jail Report that this condition of the gums was kept under control by a free use of toothsticks and charcoal tooth-powder, thus supporting our contention that this condition of the teeth of native sepoys and convicts is in the main due to neglect of the teeth. This subject of pyorrhoea alveolaris was, we note, discussed at a recent meeting of the *Royal Medical and Chirurgical Society* by Mr. Ricknan Godlee. This condition, he pointed out, is usually spoken of as "spongy gums," and is characterised by swelling and thickening of the mucous membrane of the gums, its detachment from the neighbouring teeth, and the formation of small pocket-like abscesses between the bared tooth and the gum. At a later date osteitis of the socket often leads to a shedding of the teeth. As to whether or not the condition is a local one there was much difference of opinion; one speaker maintained strongly that it was a purely local condition. On the other hand, Mr. Tomes said it was common among lemurs and monkeys kept in confinement, and Mr. Bland-Sutton that it was common in animals who were suffering from rheumatoid arthritis. It is also said to be very common in cases of glycosuria. The condition is also said to be hereditary. None of the speakers, in the reports of the meeting that we have seen, pointed out what we last year called attention to, *viz.*, that this condition is almost always confined to the lower gums, the upper ones being seldom or never attacked—a fact which we consider points strongly to the local origin of the disease. We have never been able to satisfy ourselves that the condition had any considerable bad effect on the general health, and we showed that the condition was very common in a batch of 500 healthy prisoners, as well as among sick and weakly men.

The question is one of considerable importance to Medical Officers of regiments and of jails, where the question of scurvy from scantiness of the vegetable supply is constantly cropping up, and recommendations for the purchase of costly vegetables and of lime-juice are often made. We also believe that this condition can be aggravated by repeated attacks of malarial fevers, and

the condition is most commonly seen in the autumn months, when malarial fevers are most prevalent.

SICK-ROOM INFECTION IN TYPHOID FEVER.

IN the last annual report, the Sanitary Commissioner with the Government of India (p. 24), calls attention to the question of sick-room infection in typhoid, quoting a table by Dr. Peck of Chesterfield, which analyses the sources of infection. From this table, it would appear that, in 13 per cent. of cases, the infection was traced to the sick-room, *i.e.*, personal intercourse with the sick. Some say that it is only when cleanliness is disregarded that this can take place. It will often be noted in French reports on typhoid, how this form of infection is looked upon as quite common. In one outbreak, in Germany, Kubler and Neufeld, concluded that of thirteen cases, two were due to water; the other eleven were due to direct or sick-room infection. At a recent meeting of the *Epidemiological Society*, Dr. Franklin Parsons opened a discussion on the infectivity of enteric fever. He stated that of recent years there was a growing conviction that typhoid was more commonly communicated directly from the sick than was usually supposed. He quoted from reports of many medical officers of health "numerous and indisputable instances of the propagation of the disease among members of a family or inmates of the same house, and of nurses and ward servants of hospitals, whose duties brought them in contact with enteric fever patients or their linen." He also showed that the incidence of enteric fever among the resident staff and nurses of the Asylum Board's Hospitals showed a "far greater liability" than did any other fever. The germ was probably spread by soiled fingers or inhaled in the form of dust, there was no evidence of any infectivity of the breath or perspiration. The other speakers all agreed as to the reality of this method of infection, which, it was claimed, was to a large extent recognised by medical men. Careful washing of the hands and the removal of soiled linen in closed vessels were recommended.

THE PASTEUR INSTITUTE AT KASSAULI.

THE Pasteur Institute is now in full working order, and the apparatus is arriving daily. The Director is now in a position to undertake the preparation of anti-venene, anti-typhoid vaccine, &c., in addition to the anti-rabic inoculations. He writes to the Director-General, Indian Medical Service (who permits us to make the following announcement), that "any medical officer of either service, who is keen on doing research work or to brush up his bacteriological knowledge will find every facility for so doing in the Institute, and will be welcomed and given every assistance."

CAPTAIN L. ROGERS' paper, which we publish in another column, will do much to stimulate research into the malarial problem. The remarks on the relation of the anopheles to malaria are of special importance, and the question needs much further investigation out here. We remember that Duggan (*Medical and Chirurgical Society, London, 28th March, 1897*) stated that severe malaria prevailed all the year round in Sierra Leone, but mosquitoes only appear during one month of the year, and are then not very numerous, though Major Ross' observations do not support this statement. We commend the question to our readers who, with Major Giles' book or Dr. Christie's little work, are now well provided for the not difficult investigation of the presence or absence of anopheles at certain seasons. We will refer to Dr. Neild-Cook's observations on the anopheles in Calcutta in our next issue.

LAST month we commented upon the occurrence of cases of Malta fever in Simla. There have been at least four certain cases; in all the clinical symptoms have been clear, and in two of them (which were tested) the agglutination serum reaction has been absolutely positive; in one case the serum was sent to Captain Lamb, I.M.S., and found, in the Research Laboratory, Bombay, to react absolutely with the *micrococcus melitensis*. These cases must all be due to local conditions, and as the late Captain Louis Hughes' book makes it pretty clear that the fever in Malta is due to the foul and faulty methods of sewage disposal, it is clear that the same must be true of Simla, and from what we have seen and heard (and smelt) there, there is little doubt that around many houses in Simla similar filth conditions exist, due chiefly to neglect on the part of sweepers to properly remove and bury the night-soil. From information we have received about an obscure form of fever prevalent in Darjeeling this year, we would not be surprised to hear of cases of Malta fever there too.

SOME months ago we referred to the spread of the cocaine habit among natives of the Bhagulpur District; we now learn, from a note in the *Journal of the American Medical Association* (June 23rd, 1900), that the Negroes of the Southern States have taken to this new form of vice. Cocaine sniffing or the "coke habit" is much indulged in by them, and they can buy 5 cents worth, ready done up in a paper box, without restriction, from any chemist. Some "cocaine sniffers" are quarrelsome, some hilarious and others morose, but many are described as happy and indifferent as long as the intoxication lasts.

OUT of an average strength of 3,510 British troops in Lord Kitchener's Nile Expedition of

1898, there were 299 cases of enteric fever and 83 deaths, 722 admissions for "other continued fevers," and 580 admissions and 16 deaths from dysentery.

DR. CONAN DOYLE has a good word to say for anti-typhoid inoculation. His only complaint is that the mistake was made of not having it made compulsory in the Army in South Africa.

WE note (and not for the first time) that the "*Notes from India*" in the *Lancet* for July 7th, are largely taken from our columns. To this we have not the slightest objection, only that in these days when "unacknowledged clipping" is much complained of, we would prefer to see the name of the *Gazette* given as the authority for the statements quoted.

THE Annual Note on Jails published by the Director-General, I.M.S., promises this year to be more than usually interesting.

DR. FRANK G. CLEWOW, lately on plague duty in Calcutta, and now British Delegate to the Ottoman Board of Health, pleads (*Lancet*, May 26th, 1900) for a more accurate use of the term "incubation period." The term should be used, he holds, not for the period of from last exposure to infection to attack, but for the period "which elapses between the time when the organism gains access to the surface or to the tissues, and the onset of the symptoms." In this sense the period of most infectious diseases is very short. This is exemplified in the short incubation period of cases, such as reported in our columns by Major C. R. M. Green, I.M.S. (August 1898), or Captain Prall's case (July 1898). This point, raised by Dr. Clewov, will also explain the very long period which elapsed in some cases at sea—three or four weeks after the ship had left the port. The infection was carried, but did not infect the patient till a day or so before the onset of symptoms.

THE Committee appointed by Parliament to inquire into the medical arrangements in the war in South Africa is a strong one. Mr. Justice Romer and Dr. Church, President of the Royal College of Physicians, are appointments to which nobody has taken exception. We are at a loss to see why the *Lancet* should join with the political lay press in objecting to the appointment of Dr. D. J. Cunningham, F.R.S., the Professor of Anatomy, Trinity College, Dublin. A more level-headed Scotsman could not have been chosen, and it is absurd to suppose that he would be prejudiced because for a couple of years past he has examined candidates for the Army Services in anatomy.

Mr. Burdett-Coutts, by the way, in his first letters, has clearly stated that he has no fault to find with the work of the R. A. M. Corps, as a body or individually, but he has much to say against the system. The root of the trouble lies in the question of transport, over which the Medical Department never had in any campaign any control. We never heard of a campaign in which the medical transport was not taken away from them when needed for pressing military exigencies, and indeed this must often be, as long as war is war, but medical officers are not to blame, as they have absolutely no control over transport.

The death-rate is wonderfully low for enteric on field service. It is rather absurd for the *British Medical Journal* to discuss the death-rate of typhoid by hydro-therapeutic measures in this connection. Why, Mr. Treves told us that there was often not water enough to clean a sponge, and the cold-bath treatment of typhoid is often considered impossible even in civil hospitals at home.

THE 1898 Report of the Army Medical Department contains an unusually interesting lot of papers and reports published as appendices. It seems a pity to bury these in an official report. Why should not the R. A. M. Corps start a Corps medical magazine? There is ample material, and hundreds of good cases and interesting reports are lost forever by being written only in Annual Reports, which are never published. The Corps might easily publish a monthly journal. It would be well supported, we imagine.

WE direct attention to the very interesting case of continued fever by Lieutenant-Colonel D. B. Spencer, I.M.S., in this issue. The fact that Vidal's test proved negative is somewhat against its being a case of true enteric; yet what is it? A series of cases of this kind would strongly support Colonel Spencer's theory of the difference between *Indian* enteric, and the disease produced by Eberth's bacillus.

DR. F. J. WALDO for his Milroy lectures (*Lancet*, May 12th, 19th and 26th, 1900) chose as a subject the causation of summer diarrhoea. The working hypothesis that he frames is that the "organic material and the offending micro-organisms that act as the *causa causans* of summer diarrhoea are to be found in the horse-dung that is daily deposited in vast quantities upon our highways."

If this is the case, one would expect the street boys, who so nimbly collect this material amid the crowded traffic of Fleet Street or the Strand,

to suffer most from it, whereas it is chiefly an infant's disease.

WE have also received a valuable pamphlet on epidemic diarrhoea from Dr. A. Newsholme, the Medical Officer of Health for Brighton, which we hope shortly to review.

A NEW high-class *Journal of Hygiene* under admirable editorship will shortly be announced in London. It will be a quarterly.

DR. F. TIDSWELL, in an interesting article on Carrasquilla's serum treatment of leprosy (*Inter-Colonial Medical Journal of Australasia*, May 20th, 1900) concludes that, from the uniformly discouraging nature of the reports, it is evident that Carrasquilla's procedure has not justified the hopes raised by its originator.

The same journal contained a useful note on beri-beri by Miss G. Halley, M.B., and an article by Dr. W. C. Mackenzie on two cases of beri-beri in Melbourne Hospital, in the persons of two Norwegian sailors, recently arrived from the port of Archangel in Russia; the ship had been 119 days out and had not touched a port. The food was poor—dried fish, biscuits, and tinned vegetables. Most of the crew were attacked, and one died at sea.

OWING to the special August number, we have an accumulation of matter in hand, and have not been able to find room for several interesting articles and for notices of many Annual Reports. We hope to deal with many of these in our next issue.

IN the Health Officer's Report, Calcutta, Dr. J. Neild-Cook gives a most interesting map and list of 89 tanks and pools, in which his assistants found the *anopheles* larvæ. We will refer to this more fully in our next issue.

THE outbreak of cerebro-spinal fever in the Central Jail, Bhagalpur, has been a very severe one—23 cases and 16 deaths. Captain C. R. Stevens, I.M.S., F.R.C.S., in his report has been able to trace many of them to dust, either in connection with storms of wind, or to dust produced in the process of rice-cleaning. We hope soon to find room to publish this report.

"*The Physician and Surgeon*" is the title of the latest medical journal. A new feature in this paper will be a section devoted to the interests of medical women. This department will be conducted by a medical woman in London. The editor of the new magazine is Dr. H. Laing Gordon.

Reviews.

A Handbook of the Gnats or Mosquitoes.
By Major G. M. GILES, I.M.S., F.R.C.S. JOHN BALE, SONS & DANIELSSON, LTD. London: 1900.

WE heartily welcome the appearance of this book. Everyone who has been working, ever so little, at the malarial question in its new light must often have wished to have such a book at hand. In dozens of stations in India attempts are being made to find out the habitat of and to destroy the mosquito larvæ, and to do this with any hope of success it is necessary to identify the mosquito or their larvæ. Here, at last in the English language we have the volume which will enable this to be done. If we may hope to control or limit the ravages of malaria or of elephantiasis, it can only be done by getting rid of the mosquitoes, which there is much reason to believe are the carriers of the parasite from man to man. So far the capability of acting as the intermediate host of the parasite is only established for but one or two species of the genus *anopheles*; therefore a wide field of investigation is opened out in the determination of what species can or cannot act as vehicles of the disease, a very important and practical point, for the task is a big one as it is, but if it becomes proved that only a few species are the carriers of the disease, our task at once becomes lighter and much more hopeful. The first chapter of Major Giles' book is devoted to the position and terminology of the Culicidæ, and it is written in as simple and untechnical language as possible for the benefit of medical men who are not necessarily entomologists. The next few chapters are taken up with a description of the anatomy of the adult mosquito, the larva, and the pupa. Then follows a most interesting chapter, the most interesting to the general reader in the book, on the life history of the mosquito tribe, and on the methods of observing and collecting these insects. The usual food of all species is the juice of plants, and though the females of many species suck the blood of vertebrates, food of this sort is not essential to their welfare.

A high atmospheric temperature appears to be the determining condition of these sanguinary outbursts, and we often read in the home papers of "Mosquitoes in England;" these invariably turn out on investigation to be merely indigenous species or gnats. This chapter is full of practical hints as to the prevention or getting rid of mosquitoes, even of the supposed harmless ones which annoy us by their bites. The description of the habits and resting-places of the different genera of mosquito is not only interesting but of great practical importance. Plain and practical directions are also given for the pinning and mounting specimens whether for

examination, or for despatch to some museum or collector. Chapter VII deals with the classification and distribution of the mosquito family. We learn that there are 24 species in England, 72 in Europe, only 20 in Continental Asia, 29 in the Asiatic Islands, 32 species in Australasia, 16 in Africa, 41 in North America, 9 in the West Indian Islands, 36 in South America, and three whose habitat is as yet unknown.

All these numerous species are fully described in this volume, and the numerous well executed plates illustrate the differences between them. In Part II the systematic descriptions begin, and all known species are accurately described. In the first genus, *Megarhina*, 15 species are described. In the next the *Anopheles*, from the medical point of view the most important, no less than 30 species are described, and the table on page 142 of the book with Plate VII, will enable the different species to be identified. A full description is given of *anopheles rossii*, and *anopheles a. and b.* brought from Calcutta by Major Ross. The species sent from the Bakloh Hills by Captain V. Lindesay, I.M.S., in many respects resembles *An. Rossii*, but the wing is different; it is generally much darker, and may be the species which Ross originally found to convey human malaria, but of which he was unable to obtain further specimens; it is now called *An. Lindesayi*. *Anopheles claviger*, so well known from the malaria work of Grassi and other Italian observers, has three pages of description allotted to it. In the *Psorophora* genus three species are described, and of the genus *Sabethes* three species also. Then comes the great *Culex* family, of which no less than 159 species are known and described. Of these the most important to us in India are the *Culex Taeniatus*, formerly called by Giles the *Culex Rossii*; it is apparently a cosmopolitan species, the *Culex fatigans* (Wied), which Giles now identifies with the "grey" mosquito, in which Major Ross observed the intermediate stage of *Proteosoma Labbe*, the avian hæmatozoon; this species also closely resembles *C. pipiens* which is common all over Europe. Of the *Aedes* genus only 12 species are known, none of which are described as having their habitat in India. The seventh genus is also a small one, the *Corethra*; 12 species are described, none apparently belong to India. Of the *Mochlonyx* genus only three species are mentioned, all of which have habitats in England or Europe. This concludes the book, on the issue of which we offer our congratulations to Major Giles. We strongly recommend the volume to all medical men in India; it is indispensable to every one in this country who wishes to study for himself the distribution of malaria and filarial disease in India.

The volume is handsomely got up, and the illustrations both numerous and admirably executed, and it reflects credit on the publishers.

A Text-Book of Diseases of the Nose and Throat.—By D. BRADEN KYLE, M.D., Philadelphia. W. B. SAUNDERS: 1899. (8vo, pp. 646.)

IN this recent addition to the already long list of treatises on diseases of the upper respiratory passages, nearly half the subject-matter is devoted to affections of the anterior nasal cavities and their accessory sinuses.

While the anatomy and physiology of the nasal cavities are fairly fully described, but little is said on these subjects with regard to the larynx. Special chapters are occupied by a consideration of "Neoplasms of the Respiratory Tract," and "Related Pathological Conditions of the Nose and the Eye"; the latter of which, though short, is instructive. A chapter on "Operations on the Larynx," from the pen of Professor W. W. Keen, in Philadelphia, describes in detail his method of performing complete laryngectomy.

The illustrations are, on the whole, good, especially some of those which depict various sections of the nasal and accessory cavities. The coloured plates illustrating specimens of pathological histology are unduly numerous, while those of the interior of the nose and larynx would bear improvement.

There is, however, one notable and valuable feature in this book which deserves special recognition, and that is, the pains the author has been at to give due prominence to the affections of the upper respiratory tract in constitutional diseases—a subject which not infrequently does not receive the attention which it merits. Several useful tables are also given to elucidate the differential diagnosis between diseases which bear a resemblance to each other.

The work is well printed and carefully indexed, and is, altogether, one that will be studied with profit.

A Manual of Gynæcological Practice. By DR. A. DUHRSEN. Second English Edition. Translated and edited from the sixth German edition by JOHN W. TAYLOR and FREDERICK EDGE. Crown 8vo, pp. 321. Price 6s. London: H. K. LEWIS, 1900.

WE had the pleasure of noticing very favourably the first English edition of Professor Duhrsen's Gynæcological Practice. That a second edition should be called forth so soon, amply proves that English readers unacquainted with the German language, were eager to know German gynæcological practice. The book is specially of great value, as it embodies the views of Profession Duhrssen's own practice. To the second edition has been added by the translators an anatomical introduction, giving the main facts of the anatomy of the pelvic organs, clearly and concisely.

We cannot help remarking that such high class text should suffer for bad diagrams. We strongly urge on the publishers to improve the

illustrations in future editions. Figures 33, 34, 35, 64 and 65 are hopelessly bad.

We recommend this excellent little manual to students and practitioners interested in gynaecology. The specialist will also be greatly benefited by a perusal of this book.

Mosquitoes and Malaria. By CUTHBERT CHRISTY, M.B., C.M. Bombay, *Times of India Press*, 1900.

THIS is an admirable little book which should be in the hands of every medical man in India. It gives in small space a very complete account of our knowledge of the subject of the relations of mosquitoes to malaria, at the present day, and also a sketch of the natural history of some mosquitoes. It begins by giving a short account of the malaria parasite, from its discovery by Laveran. Chapter II is devoted to the discoveries of Major R. Ross, I.M.S., and an excellent résumé of his reports is given, as well as, in another chapter, the confirmation of his discoveries by Dr. C. W. Daniels. The fifth chapter is devoted to the most recent works of the Italian observers and others. The next chapter gives a clear and interesting account of the natural history of some mosquitoes, especially of the *Culex* and *Anopheles* genera. A study of this chapter with the plates given at the end of the book will enable anyone with but little trouble to identify the ordinary *Culex* or *Anopheles* mosquitoes, the differentiation of which is made still more clear by the table of comparison on page 45.

A short chapter is also devoted to the various methods proposed for the destruction of mosquitoes. Chapter VIII, which deals with the ætiology of malaria is very interesting and discusses the known facts in the light of the new theory. On the whole, the volume is both interesting and valuable, and we strongly recommend it to the attention of our readers. Its small size and low price will also attract attention to it. The plates are admirably executed and reflect much credit on the Government Photo-Zinco office at Poona.

Lectures on Hygiene. By Dr. NEILD-COOK, D.P.H., Health Officer, Calcutta. BENGAL SECRETARIAT PRESS. Price, Rs. 2. 1900.

THIS volume contains in small bulk a very admirable résumé of modern hygiene. It was written as lectures for the class on hygiene in the Medical College, Calcutta, and we much regret to learn that the Municipality do not propose to allow Dr. Cook to continue this course in other years.

There is a wonderful lot of information contained in these pages. The book begins with a chapter on air and ventilation; the one on water-supply is also admirable and full of practical points derived from Indian experience. We learn that Norton's tube wells were employed with excellent results in the Katihar Plague

Camp and in the Rangpur District. The remarks on filters are sound and to the point. No opinion is, we notice, expressed as to the use of a Pasteur filter installation as was in use in Darjeeling. Dr. Cook's opinion of acclimatisation is sound and worth quoting: "What is called acclimatisation is much more due to a man learning what he can and cannot do with impunity in the new conditions and adapting his life accordingly." Excellent chapters follow on meteorology, refuse removal, sewage disposal, food, clothing, isolation and segregation, immunity and protection, small-pox and vaccination, and vital statistics. An excellent chapter on plague ends the volume, which is one which we should be glad to see in the hands of every Hospital Assistant and Assistant-Surgeon in India. In small compass it contains the pith of the best modern books on hygiene, enlightened and made practical by the long Indian experience of Dr. Neild-Cook.

A Manual of Pathology.—By JOSEPH COATS, M.D., late Professor of Pathology in the University of Glasgow, Fourth Edition, revised throughout by LEWIS R. SUTHERLAND, M.B., Professor of Pathology in the University of St. Andrews. LONGMANS, GREEN & Co. Price, 31s. 6d.

A PATHETIC interest is attached to the new edition of this well-known work, owing to the death of its author, leaving it, as Professor Gairdner well says in the preface, as a worthy memorial of a too short life's work. The first four hundred pages are devoted to general, and the last seven hundred to special, pathology, while the volume contains no less than 490 illustrations, which are for the most part very good, especially some of the photographs of actual specimens. The general arrangement of the subjects is excellent, and the book is wonderfully complete for its size, and for the most part well up to date. We have, however, noticed a few omissions of recent work. For example, no mention appears to have been made of the decrease in the coagulability of the blood in hæmophilia, which we now know to be a very important factor in the pathogenesis of the disease, while Nocard's recent proof of the identity of the bacilli of human and avian tuberculosis is not referred to, although the subject is discussed. With regard to plague an error is made in stating that plague bacilli are found in the pus or débris of the buboes, for although the enlarged glands contain a nearly pure culture of the organism in the early stage of the disease, it is difficult or impossible to find them once suppuration has taken place.

If we turn our attention to the more important tropical diseases we find that although no important subject is completely omitted, yet the account given of even such a universal disease as malaria is disappointingly meagre, while only one illustration of the parasites in the blood

is given with a magnification of but 250 diameters, which is of little practical use. This is the more surprising as cases of malaria must not uncommonly be seen at Glasgow, and the disease is attracting great attention at present.

In pointing out the above omissions we have nothing but praise for the work as a whole, for it contains within a reasonable compass all the essentials of the subject, while the book is so well written and illustrated that we can with confidence recommend it both to students and practitioners as a most reliable guide to pathology.

The Medical and Surgical "Review of Reviews," Volume II, 1899.—Edited by NATHAN E. BOYD, M.D., Connaught Mansions, Victoria Street, London.

THIS is a handsomely bound volume comprising the monthly numbers for last year. It is printed on good paper, in nice, clean type, with well-executed illustrations, and forms an acceptable addition to any medical library. The title given on the back of the book and on the first page is *The Medical Review*. Either this, or *The Medical and Surgical Review*, seems sufficient without adopting the pleonastic phrase of another periodical in a different line of journalism, for which the title of *Review of Reviews* is more suitable. It cannot add to the utility or popularity of any medical journal to imitate such a production even in its title.

The scope of this periodical, as indicated on the title-page, is comprehensive and ambitious, because it professes to be an indexed and illustrated monthly summary of all that is important to the practitioner in the medical periodicals of the world. The method of the Editor is excellent. By suppressing all unessential matter in any paper written with a definite object he is able to present a comparatively brief report, which yet remains a clear and readable account of the subject. Nothing of importance is lost, and sometimes much is gained in lucidity. It gives the reader a much more intelligent idea of an article than he is likely to get from a mere brief reference to its salient features.

The scheme of each number is to present (1) a condensed report of the leading articles in British, American, German, and French medical journals; (2) a summary of the transactions of medical societies; (3) an epitome of current medical literature under the sections of medicine, therapeutics, toxicology, surgery, neurology, dermatology, ophthalmology, obstetrics, gynaecology, and physiology.

Manual of Surgical Treatment and Amputation: Treatment of the Surgical affections of Bones.—By CHEYNE and BURGHARD. Part III. LONGMAN & Co. Price 12s. 305 pages.

THE volume before us is the third of six volumes on surgical treatment. The book is neatly got up and clearly and well written, and

it is easy in it to find out what we want. It represents the treatment adopted by the authors and is well up to date. From the size of the book we would expect it to be fuller on many points and to give us the views of other men on points on which there is considerable difference of opinion; still it is a book which supplies a want. It will, we think, be found a valuable book to the general practitioner. We expect that those who follow surgery pure and simple would, in a book of this size and cost, like a little of the argumentative side of many questions embodied in it. In other words, they would not like to have only the practice and *ipse dixit* of the authors.

The chapter on Rickets and Scurvy Rickets is very concise and very sound.

A few points require special notice. The authors say "Injuries to the main vein occurring as complications of fracture do not materially aggravate the severity of the case," also "when both the main vein and artery are damaged simultaneously, the danger of gangrene is, of course, far greater than when the injury is limited to only one of those vessels, but usually if proper care be taken to wrap up the limb in salicylic wool, to elevate it well, and to see that there is no undue pressure anywhere, recovery will occur." We think that in the case of the popliteal vein or of the femoral vein most surgeons would consider that it very materially aggravated the severity of the case. In the case of fractures of ribs the book does not deal with the complications of the severe types.

We also think that the treatment suggested by the authors in cases of malunion of the thigh bone would not be agreed to by many surgeons. The authors would incise all the soft tissues except the main vessels and nerves in order to stretch out the limb full length, and to do this they use a set of pulleys. Many surgeons would consider that it would be better to excise one or even two inches of bone than adopt such a proceeding, and that the patient would have a more useful limb, though short, than after the treatment suggested.

THE ANNUAL REPORTS.

THE ANNUAL JAIL REPORTS, 1899.

THE year 1899 was, on the whole, a good one as regards health in the jails of India, the combined death-rate for all India being only 23·8 per mille or nearly 9 per mille less than the decennial average (32·2).

The following is the death-rate per Province.

Andamans	...	...	49·2	per mille.
Burma	...	...	18·7	" "
Assam	...	...	55·1	" "
Bengal	...	...	23·7	" "
N.-W. Provinces & Oudh	...	...	22·2	" "
Punjab	...	...	18·7	" "
Bombay	...	...	24·7	" "
Berar and Secunderabad	...	...	13·3	" "
Central Provinces	...	...	24·5	" "
Madras	...	...	16·10	" "

The following Provinces showed an improvement on the previous year, 1898, Madras, Central Provinces, Berar, &c., Punjab, North-West Provinces and Oudh and Burma. The Andamans and

Assam fell off considerably, while Bengal and Bombay remained almost stationary. All Provinces had better rates than the (1886-95) decennial average except the Andamans and Burma. In the Andamans the increased mortality was seen all round, but especially from tubercle of the lungs. In Assam, the figures are spoilt by one outbreak of cholera in Gauhati; the total number of prisoners, however, in all Assam would not fill an ordinary Central Jail.

Cholera was conspicuous chiefly by its absence, except in Assam, as also, and to a somewhat greater extent, in 1898. The Punjab jails have for two years been free of cholera. The Andamans is always so.

The number of admissions under the vague heading "remittent fever" is greatest in Andamans, Assam, and Berar. Dysentery was highest in Andamans, Bengal, Assam and North-West Provinces. Tubercle of the lungs is markedly increased in Andamans, Assam and Burma. In Madras the tubercle ratio has been highest for the past five years, yet it was recently stated by a high authority that tuberculosis was rare in Madras. This question is discussed in another column.

In the Andamans the S. M. O. notes the disappearance of scurvy, which he attributes to the improvements of the vegetable supply. The dysentery deaths were chiefly in old worn-out men. In Burma it is stated that the diet scales are not sufficient to prevent loss of weight for men employed on the severer forms of hard labour, and extra food was issued. Sixteen per cent. of Burmese prisoners confessed to being habitual opium-eaters. The influence of the stoppage of this drug on their health after admission might well be commented upon in the Report. The high mortality in Assam is partly due to the Gauhati outbreak of cholera. The death-rate apart from cholera is, however, higher than that of most Provinces. The Chief Commissioner attributed this to the exposure involved in extramural labour. The death-rate for malarial fevers is far and away highest in Assam. The absence of Civil Surgeons to such an extent on inspection duty must have a prejudicial effect on the management of their jails.

The year 1899 was a good one in Bengal Jails, the death-rate being 23.4 or only a trifle over that of previous year (the best on record). Cholera and small-pox were practically unknown, the dysentery admission rate was high, but the death-rate per case was low. In Buxar the water-works were completed, the Pasteur filters worked well in the five jails using them, but there is no marked reduction in water-borne disease so called. Prophylaxis by quinine was well carried out, and special reports sent in from Bhagalpur and Hazaribagh Central Jails. (For latter see *Indian Medical Gazette*, March, 1900.) There was a rise in tuberculosis. The Alipur, Bhagalpur, Hazaribagh and Dacca Central Jails showed admirably low death-rates. The report on the jails of the NORTH-WEST PROVINCES is also satisfactory, the death-rate being only 22.7. Central jails here also show good results—Bareilly having only a death-rate of 8.3 per mille. The number of dysentery cases decreased, but the death-rate per case was high (10 per cent.). There is no unanimity of practice or opinion about the infectiousness of dysentery cases in this Province. There were 527 admissions and 121 deaths from pneumonia (22 per cent.). There was a distinct improvement in the health of the PUNJAB Jails, and this improvement is steady and progressive for the past twenty years. Lahore and Multan Central Jails were not healthy. The death-rate in BOMBAY Jails was only 25.2 per mille. There was considerable unavoidable overcrowding in several jails. The Bombay Common Prison, Thana and Dharwar, had the heaviest death-rate. The site of Thana is very bad, surrounded by a moat and by marshes. For remittent fever in Bombay v. *Indian Medical Gazette*, July, p. 269. The BERAR Jails were healthy; the question of ankylostomiasis in Akola has been referred in *Indian Medical Gazette*, July, p. 267.

The jails of the CENTRAL PROVINCES were healthy in 1899. Nagpur Central has a fine record (8 per mille). The outbreak of cerebro-spinal fever in Raipur has been referred to *Indian Medical Gazette*, June and July, 1900.

The jail at MERCARA (Coorg) has been very unhealthy. The MADRAS Jails have been very healthy, the death-rate being only 16.1—an unprecedentedly low rate. The Central Jail, Rajahmundry, showed remarkable improvement from 193 per mille to only 14 per mille in 1899. This pretty conclusively proves the correctness of Capt. Fearnside's views as to the nature of the disease which caused the mortality there.

We must now turn to the chief diseases. INFLUENZA still affected the jails, especially in North-West Provinces and Oudh, Berar, Assam, Central Provinces and Bengal. CHOLERA was very slightly prevalent, there were very few cases in Bengal, Madras, North-West Provinces and Oudh, and none in Punjab nor in Berar. India. "Remittent" fever largely figures in the returns of the Andamans and Assam. It generally means a severe type of fever, of a continuous or subcontinuous type, and probably often represents the restivo-autumnal types of malarial infection. The Punjab report gives an interesting table of the results of the prophylaxis of malaria by the issue of quinine. Most medical officers are in favour of it, but the Superintendent of Lahore Jail thinks it was not of the slightest benefit. The question of ENTERIC FEVER in natives of India has been much discussed in these columns

during the past year. In 1899 there were twenty-one cases so returned and twelve deaths in all jails, i. e., twenty-one cases of enteric out of a total of 40,795 admissions for "all fevers," a fact which shows the undoubted rarity of the disease in adult natives. The cases in Burma were referred to in *Indian Medical Gazette*, July, p. 267. There was a slight increase in the number of cases of cerebro-spinal fever—but ten jails were affected. There were four cases (three fatal) in Bhagalpur, ten cases (eight fatal) in Mirzapur; one case recovered at Dacca; one fatal case at Durbhanga, and twelve cases (eleven fatal) at Raipur.

There were no cases of typhus in any jail, fourteen in previous year. Relapsing fever appeared in Bombay Prison, but in no other jail. Plague only had five cases with two deaths in all the jails of India, which speaks volumes for the medical management of these institutions. There were 1,103 cases of mumps in all Indian jails. Bengal had the most cases. In the Punjab the ratio for SCURVY was 2.0 per mille, in Assam 2.3, in Central Provinces 1.9, in all other provinces it was under one per mille. In Thana Prison (Bombay) bad gums were common and unaffected by a liberal issue of good vegetables, local treatment of the gums proved useful; many such cases are probably *pyorrhæa alveolaris*. The Inspector-General of the Central Provinces notes that indications of "Scurvy" disappeared under proper local treatment, i. e., cleaning with alum and charcoal powder. At Mang Rasul Jail (Punjab) ten cases appeared.

In the Punjab PNEUMONIA is a very important jail disease, and is attributed to the native habit of sleeping with head covered by the blanket. To meet this Major Macnamara proposed to cut short the blanket.

Dysentery as usual is important, but less is said about it in the Reports than usual. The admission ratio for all India is below the average. The dysentery ratios are highest in Bengal, Assam, Andamans and Central Provinces, and lowest in Berar, Bombay and Madras. Scurvy and malaria are said to be important factors in the Punjab. The death-rate for dysentery promptly treated is about 7 per cent. (based on results in 65,818 cases). The Andamans and North-West Provinces are above this rate (9.4 and 9.8 per cent.), all the rest are below it, Bengal with a 2.8 ratio of deaths is the lowest. There were seven cases (one fatal) of Beri-beri in Burman jails, six in Vellore, one in Berhampur (Madras) Jail. No cases were returned from Rajahmundry, all those reported formerly in that jail having turned out to be malarial cachexia. There were 464 admissions for Guinea-worm in all India, chiefly in Madras, Bombay and Punjab.

THE AGRA LABORATORY.

THE report of this Laboratory presided over by Mr. Hankin is always interesting. During the past year much attention was paid to the possible origin of enteric fever in cantonments. The water-borne theory having failed to satisfactorily explain the persistence of enteric in many stations attention has been wisely turned to other possible sources of infection. At Agra Colonel Routh, R.A.M.C., sent Mr. Hankin twenty-two bottles containing flies captured around cook-houses and latrines in barracks. All were examined with negative results, except in one case where a microbe was isolated which in certain cultural characters resembled that of enteric fever. Mr. Hankin points out that flies frequently carry about a microbe, the bacillus proteus, which adds somewhat to the difficulty of isolating pathogenic ones. In view of the strong feeling that now exists in India connecting the spread of enteric fever with emanations from faulty latrines and filth-pits, it is interesting to note that fifty-two specimens of earth taken from the neighbourhood of cantonment filth-pits were examined, in no case was the enteric microbe found, but in four instances a microbe resembling it in certain characters was isolated, but it failed to react to antityphoid serum. Out of three hundred and eleven specimens of water examined the enteric microbe was isolated in twenty-seven instances. The closed wells now used to provide drinking water for the troops in Agra on no occasion contained the microbe, and it is satisfactory to learn that there has been a continued decrease in the number of cases of enteric since these wells were taken into use.

Another very interesting experiment was also attended with negative results. Colonel Routh had the hands of certain regimental native cooks and sweepers washed in sterilised water, but the water on examination by Mr. Hankin, contained no pathogenic microbes. Nor were any found in ten specimens of aerated water examined, nor in two samples of milk and cream. On the other hand, the microbe was found in one sample of water which was stated to have been treated by permanganate of potash, this was at Neemuch, and in the same station the enteric microbe was found in two samples of water used for cooking purposes in the Officers' mess. Mr. Hankin considers that the results of the year's experiment confirm his view that the enteric microbe flourishes better in comparatively pure water than in very polluted water. It is interesting to note that Professor Adami of Montreal has succeeded in isolating the bacillus of Eberth by Mr. Hankin's method, when other methods of Czupaldi, Pariotti, and His had failed. A toxalbumin was also found in some soup, to which was attributed an attack of choleraic diarrhoea. The whole report is interesting.

Current Literature.

SPECIAL SENSES.

In the *New York Medical Journal* for December 16th, 1899, appears an article by Dr. P. T. Vaughan, of Hot Springs, Ark., on "**Malarial infection as a factor in causing eye disease.**" Many of the invalids visiting Hot Springs come from malaria-infected districts, and the opportunities of seeing such cases are good. One would, therefore, have expected some real evidence in the shape of carefully recorded cases where the influence of malaria was beyond doubt and the possible influence of other infections excluded. This will not be found in this paper however. It contains numerous opinions culled from various authors regarding malaria as a possible cause of eye disease, a poor account of what might really be a case of paralysis of the third nerve due to syphilis. The age and previous history of the patient are not given and syphilis is never mentioned. The patient had marked ptosis of the right eye, injected conjunctiva, dilated pupil, cloudy cornea, slightly increased tension and opacity in the vitreous, with severe pain on the same side of the head. The symptoms more liable to exacerbations accompanied by fever and gradually disappeared while taking iron and quinine. Nothing abnormal could then be discovered except a slight opacity of the vitreous. He had had similar attacks twice during the preceding ten years. The evidence of malaria as a factor in this case as recorded is practically *nil* and would not satisfy a baby. It is quite time some protest was made against the publication of papers attributing on totally inadequate grounds of all sorts of eye diseases, functional and organic, to 'that comfortable word' malaria. A protest was raised in these columns (vide *Indian Medical Gazette*, March 1898 and 1899, p. 30) and since then numerous other unscientific papers on the same subject have appeared. We want a little of Mr. Jonathan Hutchinson's fine critical faculty brought to bear on this question.

Carbolic Acid in the Treatment of Mastoid Wounds and Chronic Suppuration of the Middle Ear.—W. S. Phillips (*Medical Record*, September 2, 1899) states that, for the past three months, he has employed carbolic acid in the treatment of mastoid wounds and chronic suppuration of the middle ear with necrosis, and in the sinuses so often left after mastoid incisions. Ordinary 95 per cent carbolic acid was used, which was applied by means of a cotton probe. Later on it was found that where the disease affected the attic, it was difficult to get the carbolic acid in contact with the tissues. To overcome this difficulty, he constructed a spraying apparatus with a finely drawn tube, so that the acid could be sprayed into the attic and middle ear. In nearly all the cases so treated the suppurative process almost immediately subsided. The alcohol, which it is necessary to use immediately after the carbolic acid, causes considerable discomfort; therefore it is advisable to avoid using an excess of the acid. So far, he has observed no ill effects or inflammatory reaction resulting from its use.—*Medicine*, October, 1899.

At the meeting of the *Sixth International Otological Congress* recently held in London, an important discussion was held upon "**The Indications for opening the Mastoid in Chronic Suppuration of the Middle Ear.**" Prof. Politzer, who opened the discussion, divided the indications into two main groups; objective and subjective. The *objective* indications were:—(1) Caries of the tympanic walls. (2) Granulations and polypi in the neighbourhood of the aditus, and recurring after removal. (3) Fistulae leading into the mastoid cavities, and frequently leading to cholesteatomata. (4) Cholesteatoma. (5) Hyperostotic stricture of meatus. (6) Facial paralysis or paresis. (7) Painful swelling on the mastoid (indicating acute mastoiditis, fistula, cho-

lesteatoma, or sequestrum. (8) Obstinate long-continued foetid discharge, rebellious under all forms of treatment, especially when the perforation is in the postero-superior quadrant, and the remains of the membrane are adherent to the inner wall; and still more, if pus or especially crumbling masses of epithelium can be sucked out by means of Siegle's speculum.

F. P. MAYNARD, M.B.

Correspondence.

SIZE OF OVARIAN TUMOURS.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—In the June number of the *Indian Medical Gazette*, Major C. E. Sunder, in his article on Abdominal Surgery at Gya, refers to an ovarian cyst removed in China "said to have contained 150 pints." In the *British Medical Journal* for November 11th, 1899, No. 2023, there is an abstract of a paper, read in the section of pathology, at the meeting of the British Medical Association in 1899, by Mr. Roger Williams "On Tumours of Gigantic Size." Mr. Williams refers to an ovarian tumour removed by Dr. Elizabeth Reifsnider of Shanghai and described as the largest extant. It weighed 169lbs. In Major Sunder's case the cyst contained 100 pints altogether, equivalent to 125lbs., since the standard gallon of eight pints = 10lbs.

Yours, &c.,

MOZUFFERPUR,

C. R. M. GREEN,

July 1900.

Major, I. M. S.

"A GARBLED QUOTATION."

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—(Dr. Ross's statement is correct, the words "in malaria" are not found in the article in the *Times* of November the 28th.—Ed. I. M. G.)

The words "in malaria" were added by me to a quotation from the article in the *Times* in order briefly to explain its meaning, and were by mistake included in the quotation itself. Dr. Ross says "there is no justification for them either in my words themselves or in their context." Readers of this journal may judge of the honesty of this disclaimer for themselves; the whole passage, words and context, runs as follows:—

Dr. Ross "believed that in the coming century the success of Imperialism would depend largely upon success with the microscope. Our possessions in Africa were battlefields between Englishmen and King malaria; they were conquests maintained only at the sacrifice of hecatombs of our countrymen."

To me this extravagant and exaggerated statement conveys only one meaning, but whether it refers to the investigation of malaria, which is the gist of the entire article in the *Times*, or to the investigation of other diseases, is a matter of no consequence whatever—it is equally ridiculous both ways. Will anybody believe that the success of Imperialism in the coming or any other century will depend, even remotely, upon the microscope? As for the sacrifice of "hecatombs" of our countrymen—*ex hypothesi* at the altar of Anopheles—it is a notorious fact that even in the most unhealthy parts of Africa, which are comparatively small areas, where no vast numbers of our countrymen make any attempt to reside permanently, malarial fevers can usually be prevented by such measures as the judicious employment of quinine, sleeping at a height which is above the range of the malaria miasma, and drainage. These facts were widely known long before the discovery of the Laveran body in the blood, and for this reason I contended that on Dr. Ross's own showing the principal value possessed by the microscope in malaria is a commercial one. Can it be said that professionally it has advanced our knowledge of the treatment of malaria, preventive or curative, by so much as a single hair's breadth? For the benefit of those who have not had an opportunity of reading the *Times* of November, 28th 1899, I beg to be permitted to quote one more passage from the same article:—

"Twenty years ago the parasite which caused the disease (fever) was found, but not a microscope or pen was used by Englishmen for seven years. During these seven years 35 million people died from fever in India alone. * * * Not another Englishman moved in the matter for another seven years, lazy, indifferent, and imbecile scepticism holding the ground."

The scathing terms "lazy," "indifferent," and "imbecile" were employed by Dr. Ross before a lay audience in England with reference to the whole of the medical profession in India, and

were I presume intended to make it appear *prima facie* that there was some kind of sinister connection between the 35 million people who died from fever and the Englishmen who were too "lazy, indifferent, and imbecile" to use a microscope or pen in its treatment. The microscope by all means, but why a pen? Dr. Ross's delicate allusion to "innuendo" on my part requires no comment, truly it comes well from such a critic.

Yours, &c.,

HYDERABAD.

E. LAWRIE, M. B.

Lt.-Col., I. M. S.

Service Notes.

WE have to record, with much regret, the death in London of Lieutenant-Colonel C. H. J. Warden, I.M.S., lately Examiner of Medical Stores at the India Office, London.

Lieutenant-Colonel Warden was for many years a Civil Surgeon in Bengal, and afterwards was appointed Chemical Examiner, Bengal, and Professor of Chemistry in the Medical College, Calcutta. He resigned this appointment a few years ago and was appointed Medical Storekeeper to Government in Bengal.

He was a chemist of high repute, and did a great amount of original chemical work on the indigenous drugs of India.

He served on the Hemp Drug Commission of 1893. His whole life in India was devoted to scientific work, and in his death the INDIAN MEDICAL SERVICE has lost one of its brightest ornaments and one whose repute as an original chemist reflected lustre on the service. His death will be much regretted by a large number of friends in India.

For the following list of Dr. Warden's scientific contributions we are indebted to his friend, Mr. D. Hooper of the Indian Museum—

A Chemical examination of the root of <i>Glonosa Superba</i> ...	<i>Indian Medical Gazette</i> , 1st Oct. 1880.
A blue colouring principle contained in <i>Thevetia nerifolia</i> .	<i>Pharm. Journ.</i> , 19th Nov. 1881.
The separation of Ether ...	<i>Journ. Doe. Chem. Ind.</i> , 6th May 1882.
Note on the presence of a second poisonous principle in <i>Thevetia Nerifolia</i> .	<i>Pharm. Journ.</i> , 15th July 1882.
<i>Abrus precatorius</i> ...	<i>Indian Medical Gazette</i> , March 1882.
<i>Pistia stratiotes</i> (Tropical Duck-weed).	<i>Chem. News</i> , XLVII, 133 (1883).
On an impurity in Ether ...	<i>P. Journ.</i> , 3rd Jan. 1885.
The active principle of Indian Hemp. (With L. A. Waddell).	<i>Indian Medical Gazette</i> , Dec. 1884.
Madar (with L. A. Waddell) ...	<i>Pharm. Journ.</i> , 22nd Aug. 1885.
Snake poison ...	<i>Chem. News</i> , LIV, (1886), 197.
Notes on Jalap Tubus grown at Mussoorie, N.-W. P. ...	<i>Pharm. Journ.</i> , 13th Aug. 1887.
<i>Embelia ribes</i> ...	<i>Pharm. Journ.</i> , 21st Jan. 1888.
Coca tannic acid ...	<i>Pharm. Journ.</i> , 21st May 1888.
Note on <i>Erythroxylon coca</i> grown in India.	<i>Journ. Agri-Hort. Soc., India</i> , 1888.
Margosa oil ...	<i>Pharm. Journ.</i> , 27th Oct 1888.
<i>Picrasia guas-ivides</i> (with Dr. Dymock).	<i>Pharm. Journ.</i> , July 1889.
Fruit of <i>Erythroxylon Coca</i> ...	<i>Pharm. Journ.</i> , 5th July 1890.
<i>Luffa echinata</i> (with Dr. Dymock)	<i>Pharm. Journ.</i> , 7th June 1890, 997.
Rapid method for estimation of Urea in Urine.	<i>Pharm. Journ.</i> , 27th Dec. 1890.
<i>Aristolochia Indica</i> ...	<i>Pharm. Journ.</i> , Sept. 1891.
Shukai. (With C. L. Bose) ...	<i>Pharm. Journ.</i> , Jan. 1892.
False Bikhma ...	<i>Pharm. Journ.</i> , 8th Oct. 1892.
... of precipitated by Meyer's reagent with Alkaloids.	<i>Pharm. Journ.</i> , Aug. 1892.
Indian Opium ...	<i>Pharm. Journ.</i> , 25th Apr. 1891.
Note on a Cholesterol in root of <i>Hypophila Spinosa</i> (with C. L. Bose).	<i>Pharm. Journ.</i> , Feb. 1892.
On the apparent action of light in inducing crystallisation of stannous Iodide.	<i>Pharm. Journ.</i> , 25th June 1892.
On the separation of Copper Nitrate from Silver Nitrate in the manufacture of Caustic.	<i>Pharm. Journ.</i> , Jan. 1897.
A drying box for pills...	<i>Pharm. Journ.</i> , Mar. 1897.
On the use of steam coils for evaporation.	<i>Pharm. Journ.</i> , Apr. 1897.

Oil of Zanthoxylum (with Prof. Pedler). *Journ. Asiatic Society, Bengal*, 1888.
 Nature of the Toxic Principle of the Arvidece (with Prof. Pedler.) *Journ. Asiatic Society, Bengal*, LVII (1887).

WE are glad to learn that a new Edition of the excellent *Hand-book of Hygiene* by Major A. M. Davies, R.A.M.C., is being prepared. In small compass it contains more than many a volume six times its size. We should like to see it in the boxes of every Field Hospital.

A SECOND enlarged edition of Major W. J. Buchanan's *Manual of Jail Hygiene* is nearly ready—published by the Bengal Secretariat Press.

WE are glad to know that a fund is being raised as a memorial to the late Lieutenant-Colonel A. Adams, I.M.S., who served the Western Rajputana States for eighteen years. It will probably take the form of improvements to the hospital at Mount Abu.

WE note that Major Ronald Ross, in a recent lecture at Liverpool, laid much stress on the amœba which is said to be the cause of dysentery. It is not often now that the amœba has a word said in favour of it. The American Commission on the diseases of the Philippines would have none of it.

WE are glad to see that the *British Medical Journal* (p. 45, July 7th) recognises the independent claims of Captain S. P. James, I.M.S., to the discovery of filarial metamorphosis in the Anopheles as well as in culex. We were informed of Captain James' discovery early in May, and published a note to that effect in our July number.

A NEW and revised edition of Quain's *Dictionary of Medicine* will shortly be announced.

THERE is a rumour that Dr. D. F. Keegan is thinking of bringing out a book on operations for stone.

AN article by Major H. Herbert, I.M.S., on Lymphocytes in chronic inflammation appears in German in the *Monatshefte für Praktische Dermatologie* XXX, Band., 1900.

WE are glad to read of the safe arrival at Shanghai of Major Manifold, I.M.S., and his companions, after their adventurous journey in China.

UNDER the title "The Benificent Spider" the *Journal of the American Medical Association* (for June 23rd) devoted an editorial half column to the article by Colonel M. D. O'Connell, R.A.M.C., which appeared in our columns in February 1900 (p. 41.)

OWING to the large number of medical officers volunteering for service with the Indian Contingent in China, orders have been issued to strictly observe the roster for service and men in military employ are to be employed on field service before officers of the I. M. S. recalled from civil employ.

THE following figures will show that the stoppage of leave out of India was unavoidable, owing to the demand of Medical Officer for the China Expeditionary Force:—

100 men of I.M.S. are on leave out of India.
 42 in Frontier Field Hospital, not on the cadre of appointments and not recruited for.
 60, about sixty to go to China.*

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Total appointments 330 in civil, 198 in military, total 528 appointments in cadre list. In the I.M.S. there are 667 men; deduct the 528 cadre appointments, and 667-528=139 men available for leave, and all extra appointments or emergencies. 100 are on leave, this leaves only 39 men in place of the 102 (42 + 60) noted above, hence the shortness in the Military side and the withdrawal of men from civil employ to fill up military vacancies.

THE civilian medical officers, now so freely employed on temporary military duties in England, are being paid at the rate of £1 a day, considerably more than the average man in the R. A. M. C. would get for the same duties.

PARAGRAPHS 1 and 2, I. A. R., Vol. II, are reconstructed as follows:—

"1. The Officer Commanding the Regiment, or other Commanding Officer, will enter his remarks in column 2 of A. H. F.

* So on 1st August.—Ed., I.M.G.

85, Confidential Report on officers of the Indian Medical Service, referred to in paragraph 156, and forward it to the District Principal Medical Officer for his remarks and for transmission to the General Officer Commanding the District. The last-mentioned will, after endorsing his opinion thereon, forward the confidential report to the Principal Medical Officer of the Command, for the information of the Lieutenant-General Commanding, and subsequent transmission to the Principal Medical Officer, Her Majesty's Forces in India.

"2. On receipt of the confidential reports (A. H. F. 85) on officers of the Indian Medical Service by the Command Principal Medical Officer, he will prepare a summary on I. A. F. O-407 and forward it (through the Lieutenant-General Commanding) to the Principal Medical Officer, Her Majesty's Forces in India, who, after adding his remarks thereon, will send the summary to the Adjutant General in India, for transmission to the Government of India, and forward the confidential reports to the Director General, Indian Medical Service."

The Government of India have recently republished the order "that without obtaining the authorisation of the Government to which he is immediately subordinate, no officer of Government is permitted to have recourse to the Courts for the vindication of his public acts, or of his character as a public functionary from defamatory attacks—as it is for Government to decide in each case whether the institution of proceedings is necessary or expedient, and officers are forbidden to communicate with the press in respect of their official conduct or to act without the previous consent in writing of the Local Government under which they serve. This does not affect an officer's right to defend his private dealings or behaviour in any way he may be advised."

The services of the undermentioned officers are placed temporarily at the disposal of the Military Department:—

Lieutenant-Colonel Dharmadas Basu, I.M.S. (Bengal).

Major Hem Chandra Banerji, I.M.S. (Bengal).

Captain H. M. Earle, I.M.S. (Bengal).

Captain C. B. Prall, I.M.S. (Bengal).

Captain P. St. C. More, M.B., I.M.S. (Bengal).

Captain J. Davidson, M.B., I.M.S. (Bengal).

Captain T. H. Foulkes, I.M.S. (Madras).

Captain W. Selby, D.S.O., I.M.S. (Bengal).

Captain E. J. Morgan, M.B., I.M.S. (Bengal).

Captain E. E. Waters, M.B., I.M.S. (Bengal).

Captain T. E. Watson, M.B., I.M.S. (Madras).

Captain C. G. Webster, I.M.S. (Madras).

Captain A. F. W. King, I.M.S. (Bombay).

Lieutenant H. Kirkpatrick, M.B., I.M.S.

Lieutenant F. D. S. Payrer, I.M.S.

Lieutenant W. Lethbridge, M.B., I.M.S.

The services of the undermentioned officers are replaced at the disposal of the Military Department:—

Captain F. N. Windsor, M.B., I.M.S. (Bengal).

Captain W. W. Clemesha, M.B., I.M.S. (Bengal).

Captain J. C. Robertson, M.B., I.M.S. (Bengal).

Captain N. R. J. Rainer, I.M.S. (Bengal).

Captain F. A. L. Hammond, I.M.S. (Madras).

Captain W. G. Richard, I.M.S. (Madras).

Captain F. E. D. Browne, M.B., I.M.S. (Madras).

Captain E. F. E. Baines, I.M.S. (Bombay).

Captain G. O. F. Sealy, I.M.S. (Bombay).

Lieutenant E. F. G. Tucker, I.M.S.

LIEUTENANT-COLONEL J. YOUNG, M.B., Indian Medical Service, Bengal Establishment, is granted the temporary rank of Colonel, with effect from the 14th July 1900, whilst officiating as Principal Medical Officer, Presidency District, *vice* Colonel J. T. Bookey, Indian Medical Service, appointed Principal Medical Officer, China Expeditionary Force.

The following were reported as dangerously ill:—Surgeon Lieutenant-Colonel W. W. Lake, Militia Medical Staff Corps, at Bloemfontein; Civil Surgeons R. W. Jameson and A. Robertson, at Kroonstad; Civil Surgeon W. W. Bennett, No. 1 Stationary Hospital, Natal; Civil Surgeon W. H. Steele, at Kimberley.

MAJOR GREIG, R.A.M.C., and Civil Surgeon Ash, suffering from enteric at Heilbron, are reported as doing well.

CIVIL SURGEONS SMALLMAN AND HUNTER, have been discharged from hospital to duty.

MAJOR H. G. HATHAWAY was severely wounded in the abdomen in the fighting near Pretoria on 11th June; and Captain J. H. Campbell was also severely wounded during the operations in Natal on 24th February.

ASSISTANT SURGEON GEORGE FARR WHITE, F.R.C.S., late of H. M. s. 77th Regiment, died at Wimbledon on 20th June. He was appointed Assistant Surgeon, 1st October 1860, and resigned the service 18th December 1867.—(B. M. J.)

LIEUTENANT-COLONEL C. H. JOUBERT, Bengal Establishment, is promoted to be Colonel from March 29th. He joined the department as Assistant Surgeon, March 30th, 1872, and became Brigade-Surgeon-Lieutenant-Colonel, October 1st, 1896.

THE promotion of the following Majors to be Lieutenant-Colonels from March 31st, which has been already announced, has received the approval of the Queen:—Bengal: C. P. Lukis, R. R. H. Whitwail, L. A. Waddell, D. B. Spencer, J. Clarke, M.D.; C. C. Vaid, P. D. Pank, T. R. Mulrone, M.D.; T. R. Macdonald, Madras; R. H. Cama, W. B. Browning, C.I.E.; C. M. Thompson, C. S. Rundle, J. W. Evans, Bombay; H. P. Dimmock, M.D.; C. B. Maitland.

THE promotion of the undermentioned Captains to be Majors has likewise received the Royal sanction:—D. G. Marshall, D. M. Noir, M.D.; H. F. Whitechurch, V.C.; J. R. Roberts, F. W. Gee, Kanta Prasad, P. W. O'Gorman, W. H. Gray, G. T. Mould; Madras; A. E. Grant, F. C. Pereira, Bombay; J. G. Hojel, H. C. L. Arnim, G. S. Thomson.

WE regret to have to record the death at Lucknow from heatstroke of Capt. Stevenson, I.M.S.

DEPUTY SURGEON-GENERAL HENRY CAYLEY, Bengal Establishment, retired, is appointed Honorary Surgeon to the Queen, *vice* Surgeon-Major A. Grant, retired, Indian Medical Service, July 11th, Deputy Surgeon-General Cayley entered the service as Assistant Surgeon, January 29th, 1857; became Brigade-Surgeon, April 19th, 1884; and retired, with the honorary rank of Deputy Surgeon-General, April 29th, 1887. He served in the Indian Mutiny Campaign in 1857-8 in the Benares, Allahabad, and Goruckpore Districts, receiving the medal.

COLONEL G. W. R. HAY, M.D., Bombay Establishment, is promoted to be Surgeon-General, *vice* Surgeon-General C. E. M'Vittie, Madras Establishment, retired, dated May 26th Surgeon-General Hay joined the department as Assistant Surgeon, April 1st, 1868, and became Surgeon-Colonel, August 16th, 1897. He is appointed Principal Medical Officer, Madras Command, from May 26th, *vice* C. E. M'Vittie.

LIEUTENANT-COLONEL J. F. TUOHY, M.D., Bengal Establishment, has retired from the service from June 24th. His first commission dates from October 31st, 1879; that of Lieutenant-Colonel from October 31st, 1899. He was in the Afghan War in 1880, and has the medal for that campaign.

LIEUTENANT-COLONEL D. W. D. COMINS, Bengal Establishment, also retires from July 16th. He was appointed Assistant Surgeon, March 31st, 1875; and Surgeon-Lieutenant-Colonel, March 31st, 1895. He served in the Afghan War in 1878-79 with the Kandahar Field Force, and was in the engagement at Charasiah on October 6th, 1879, at the capture of Cabul, the action at Lataband, and the relief of Sherpur; he was twice mentioned in despatches, and received the medal with two clasps. He has been Inspector-General of Jails, Bengal, since 1892.

Lieutenant-Colonel J. W. Evans, Madras Establishment, likewise retires from May 9th. He entered the service as Assistant Surgeon, March 31st, 1880, and became Lieutenant-Colonel, March 31st, 1900. He was with the Burmese Expedition in 1885-86, and has the Frontier medal with clasp.—B. M. J.

BOOKS, REPORTS, &c., RECEIVED.

Advance Reports of Transactions of International Medical Congress at Paris.

Manson's Tropical Diseases, New Edition. (Cassell & Co.)

Report on Calcutta Medical Institutions.

Report on Madras Medical Institutions.

Report on Bengal Dispensaries.

Report on Punjab Dispensaries.

Report on Assam Dispensaries.

Assam Vaccination Report.

Catalogue of the Library of the Inspector-General of Civil Hospitals, Bengal.

Malaria and Mosquitoes. By R. Ross (Liverpool Univ. Press.)

Report of the Liverpool Malaria Expedition.

Freyberger's Pocket Formulary for Diseases of Children (Rebman, Ld.).

Year Book of Scientific Societies, 1900. (G. Griffin & Co., Ld.)

COMMUNICATIONS RECEIVED FROM:—

Capt. S. P. James, I.M.S., Quilon; Major Cunningham, I.M.S., Delhi; Major Maynard, I.M.S., London; Major D. G. Crawford, I.M.S., St. Andrews; Col. T. H. Hendley, C.I.E., I.M.S., Calcutta; Major A. M. Davies, R.A.M.C., Simla; Capt. Cochran, I.M.S., Puri; Capt. H. Smith, I.M.S., Jullundur; Lt.-Col. W. H. Henderson, I.M.S., Bombay; Dr. P. Chandra Sekar, Madras; Major W. H. Burke, I.M.S., Rajkote; Capt. O. Barry, I.M.S., Rangoon.

Original Articles.

ANKYLOSTOMIASIS IN THE ANDAMANS.

By R. NEIL CAMPBELL,

LIEUT.-COLONEL, I.N.S.,

Late S. M. O., Port Blair.

ANÆMIA is very common in the Andamans, and is shown as the cause of many deaths. Excluding anæmia caused by many wasting diseases, and constitutional affections, it may be divided into three great classes:—

1. *Anæmia*, due to Malaria.
 2. *Anæmia*, or *ankylostomiasis*, due to the *dochmius duodenalis*, and,
 3. *Anæmia*, the result of malaria and the *dochmius* combined.
1. *Anæmia due to malaria, or malarial cachexia*:—

Malarial affections are very common, as in the Andamans all the factors favouring malaria prevail, *i.e.*, heat, moisture (a heavy rainfall), thick jungle and low-lying swamps. When to this is added the other conditions under which the convicts more especially exist, *i.e.*, the nature of the labour, water-supply, &c., it is only natural to expect that malarial cachexia, or anæmia, should be common.

This form of anæmia is generally easily distinguished by the signs and symptoms of malaria: the yellow eye, the enlarged spleen, the emaciated frame, and the various gastro-intestinal symptoms along with the temperature are sufficiently distinctive. Where dropsical signs appear, it is more frequently in the form of ascites, or that combined with œdema of the feet, and is chiefly due to cirrhosis of the liver.

The greater number of the convicts work extramurally at brickmaking, excavating earth, cutting firewood, grass, or jungle, clearing forest, reclaiming swamps and on the tea gardens, in all of which the labour is hard, and the exposure to climatic variations of sun and rain, heat and cold, very trying. The forms of labour, as I have said, render them very liable to suffer from malaria, and, as a consequence, anæmia.

2. *Anæmia due to the dochmius duodenalis, or ankylostomiasis*—is very common in the Andamans.

The forms of labour already mentioned are favourable to its development, provided the ova of the parasite are present. The self-supporting convict who suffers less from malaria and other diseases than the labouring convict, suffers equally from this form of anæmia. He labours chiefly as an agriculturist in growing paddy, &c., and this form of labour is particularly favourable to the development of the *dochmius*. It is very important to diagnose this form of anæmia at an early date, as the prognosis is then very favour-

able, the treatment satisfactory, and the cure rapid: whereas, if the disease is far advanced when first seen, all treatment is as a rule of little avail.

3. *Anæmia, the result of malaria and the dochmius combined.*

This form is frequently met with and requires no special description or treatment. The treatment necessary is that required for the second form, early and complete expulsion of the parasites, and then the usual anti-malarial remedies.

Ankylostomiasis.

This disease, as every one knows, is most common among those who labour in the fields and at dirty work as brickmaking, &c., and who live in insanitary conditions with regard to water-supply. Hence the Andamans is a peculiarly favourable spot for the spread of it.

For practical purposes, more especially as regards prognosis and treatment, I divide this disease into three stages. This division is quite empirical, and the various stages run so insidiously the one into the other, that it is difficult always to say the exact stage; still, I think it an advantage.

Diagnosis.

1st or dyspeptic stage.—This name is given because all the symptoms are those of dyspepsia or obscure gastro-intestinal affections. In this stage frequently the patient will not believe there is any thing wrong with him. His appetite is probably good, it may be large: his bowels regular, or inclined to be constipated. If, however, the weight is taken, there will be found a gradual but steady fall from week to week. This can be tested in jails where the disease prevails, and when a gradual steady loss each fortnight without any apparent cause is found, the microscope should be used and search made for the ova. It only requires a microscope with a low power to distinguish the ova. 100 diameters is sufficient, though to examine and compare with other ova a higher power is advisable. In examining excreta for ova, always use a low power first, as so much more work can be done and only when necessary for comparison need the high power be used.

Besides the loss in weight, the following may be said to be the *signs and symptoms*:—

Signs.—The tongue may seem a little paler than natural, though no anæmia of the mucous membrane of the eye is present, the *skin*, especially of the face, is a little harsh and dry and what may be called “ashy.”

Symptoms.—There may be pain in the stomach and round the navel, aggravated on deep pressure; colic, flatulence, depraved appetite (such as eating mortar). Possibly the patient may say he feels out of sorts and thinks a purgative would do him good as his bowels are out of order. There may be also a low continued fever.

To make certain, the microscope should of course be used.

2nd or anæmic stage.—In this, the second stage, there is development of progressive anæmia, hence I have called it by that name. Here all the signs and symptoms of the first stage are met with in an aggravated form. There is marked though not profound anæmia. The falling off in weight continues and is more marked, yet there is no emaciation, and indeed there may be considerable adipose tissue even in advanced cases. How marked is this from the anæmia of malaria where there is decided emaciation.

Signs.—There is distinct anæmia of the skin and mucous membranes. The eye is white, *not yellow*, as in malaria. The *skin* has a marked ashy, dry and darkish hue. The *face* seems broad and puffy, though no œdema is present.

Symptoms.—Loss of appetite, bowels constipated or with occasional attacks of diarrhœa, weakness, inability for hard work, palpitation, and as it progresses breathlessness also, on the slightest exertion. The anæmic bruit is developed in the pulmonary area, giddiness, dimness of vision, and tinnitus aurium may also be present. The dyspeptic symptoms with the colic, and umbilical pain, increased on pressure still continue. This stage is in fact only a fuller development of the first stage, and runs into the third stage.

If regular inspection parades are held once a fortnight or monthly and suspicious cases selected for treatment, it should, as a rule, be easy to detect the cases in this stage.

3rd or œdemic stage.—This name is given as now the heart and circulation have become affected shown by œdema and various dropsies.

Signs.—The advanced stage is marked by the following *signs*. Profound anæmia of skin and mucous membranes. *Skins*, markedly darker and dry, the true ashy look. Œdema of the lower extremities first, and then spreading. Œdema of the face and perhaps general anasarca with even marked ascites—though as a rule there is only œdema of the feet, legs and face. The heart is dilated, and there is fatty degeneration of the fibres.

Symptoms.—All those of the second stage, only aggravated and often accompanied by diarrhœa or dysentery, in which case there is marked emaciation. Pneumonia may also supervene. The temperature is often sub-normal.

I think I have now shown that the stages are very gradual, and that these names proclaim their distinctive characters.

Post-mortem appearances.—I need not go into these, as they vary with the stage and may be got in text-books. I need only say that I have found ankylostoma in the stomach, duodenum, jejunum, and ileum; that the favourite spots are the duodenum and upper portion of the jejunum. Ankylostoma may be

found dead and being passed in the contents of the bowel; a case I saw lately, of malarial fever with jaundice, the worms were found low down in the ileum, dead and dark green from bile staining. As a rule, the worms are found alive and firmly adherent to the mucous membrane. Ecchymosis and extravasation into and under the mucous membrane are often met with, as also pigmentation and thickening. There may also be the regular punctiform marks where worms have been adherent, though few or no worms be present, yet there may be many of these marks. The worms are surrounded by a thick glairy mucus often tinged with blood (sometimes more than tinged, there may be regular extravasation into the lumen of the gut). It is necessary to remove this mucus before you can see the parasites, and this is also a necessary part of the treatment.

Prognosis.

This varies with the stage.

1st dyspeptic stage.—The prognosis is good. The effects of the disease are not of a lasting character, so that with the removal of the parasites, cure is easily obtained unless the patient is aged.

2nd anæmic stage.—The prognosis is still hopeful, but as the effects of the parasite have gone further there is naturally, after removal of the parasites, a long and tedious course of treatment, which unfortunately often proves of no avail. There is not only the loss of blood, and the poorness of the blood remaining to improve, but there are the changes in the mucous membrane of the small intestine, and the natural loss of appetite and inability to digest what food is taken, to be rectified. Age is a most important factor in this stage. Over fifty it is very grave. Between thirty-five and fifty state hopeful, under thirty-five good.

3rd œdemic stage.—The prognosis is very grave. The number of recoveries when the disease is far advanced is very small. The treatment is mainly directed to improve the condition of the heart and circulation, the blood and gastro-intestinal canal, all of which are naturally affected. The effects are so very grave that it is natural the treatment should, as a rule, be of but little avail. In may be said to be hopeless except in those under thirty years, and even then it is grave.

Treatment.—In each stage this may be divided into two heads:—

A. Treatment for expulsion of the parasite.

B. The after treatment required to repair the effects of the parasite.

1ST DYSPEPTIC STAGE.

A. *Expulsion of the parasite.*—This should be undertaken without delay so as to prevent, as far as possible, the parasites present from injuring the mucous membrane of the intestines

longer than necessary, and causing aggravated dyspeptic symptoms. The patient should be brought into hospital, and the day prior to treatment should be kept on a low diet, special care being taken to see that no solid food is taken after 2 P.M., though soup or tea may be given.

At bed-time, a dose of calomel, grains 5, should be given. The following morning early, if the patient is strong, a dose of castor-oil along with 5 grains of santonine may be given, to be followed an hour after by thirty grains of thymol. The thymol should be well pounded in a mortar before being given, otherwise it will pass through the bowels in lumps without causing any effect. It should be given in a little water, followed by a little more water as it burns the throat slightly. Three hours afterwards, a full dose of castor-oil is given. The stools should be collected for twenty-four hours and examined. Worms continue to be passed for many hours after this, but it is sufficient to examine those of the first twenty-four hours. Nothing should be given to the patient until the last dose of oil has worked well. He may feel a little weak and giddy, but all that is necessary is to make him lie down: a little tea or soup may be given. After the bowels have been cleared out, he may be allowed more food.

Frequently only one dose of oil is given (that is, if the calomel has purged him well), and that is, the dose three hours after the thymol. The santonine should not be ordered with the thymol. If mixed it only takes a few minutes for the two to become an oily liquid, and this we do not want. The santonine is often given with the calomel the evening before. Stimulants should not be given for some time after the thymol, as this drug would be dissolved and this is to be prevented.

R. After treatment.—Frequently after passing many worms there is a colico-enteritis with diarrhoea, blood, mucus and pain. The best thing to give is bismuth and Dover's powder. A few powders of rhubarb, soda and bismuth may do good: but often, one is able to start at once on the tonic treatment, of which the best is a mixture of iron with quinine and arsenic after food. For a day or two the diet should be light and simple, not in too great quantities, but frequently. Before many days ordinary diet and full diet may be allowed. It is a good thing to keep them for a week or two in the convalescent gang and give extra milk. Of course the after treatment varies with the number of parasites discharged, and the effects caused by their discharge. When the number of parasites is small, and they have caused little or no effect, the patient may return to duty at once almost. The thymol treatment has to be repeated as long as ova of *dochmii* are present in the stools. The second course should be given about ten days after the first, and the third

a fortnight later. It is seldom necessary to give more than three courses.

This mode of giving thymol does not affect patients as the old method of giving ninety to one hundred and twenty grains spread over a few hours. Many patients used never to rally from the old treatment.

This is the treatment I have used since 1891, but occasionally I have given thymol in the old method, *i.e.*, doses at intervals of two hours, three doses of thirty grains each, or ninety grains in all. This was the way I treated the Nicobarese, as I was afraid they would not allow themselves to be treated again and again. Amongst children who are strong I prefer the three doses of seven to ten grains each, according to age instead of the long treatment extending over weeks.

2ND ANÆMIC STAGE.

A. Expulsion of the parasite.—The treatment is the same as in the dyspeptic stage, that is, speedy and complete expulsion of the parasites with thymol and santonine.

B. After treatment.—The effects are more serious than in the dyspeptic stage, hence the after treatment is much more protracted. To remedy the anæmia, blood tonics, especially salts of iron, should be given combined with strychnine and may be arsenic. For the bowels, it may be necessary to give bismuth and opium, but often not. The diet must be carefully looked after, and the patient must be kept in hospital or in the convalescent gang for a long time. Weekly weightment will show the improvement, which is very gradual. Very gradual return to hard labour.

3RD CÆDEMIC STAGE.

A. Expulsion of the parasite.—In this stage, generally, the number of worms present is very small as they have dropped off or even died for want of nourishment, and it is not the parasites so much that we have to get rid of, as the effects they have caused that we have to remedy. It is always well to give one dose of thymol, however, to get rid of what worms may be present; but as a rule it is not advisable to repeat it, as in the other stages, until we have overcome the symptoms present, when it may be repeated, say, four or six weeks later.

B. After treatment.—This stage shows the effects of the parasite fully developed. These effects may be said to be caused first by the direct loss of blood from the suction of the parasites, ecchymoses and hæmorrhages, and secondly, to the injury they cause the mucous membrane and sub-mucous tissues by their fish-hook or claw-like teeth, the change in these tissues from the wounds and inflammation caused by them and the consequent inability to assimilate food. In this stage one of the chief, if not the chief, effect we have to remedy is the enfeebled heart and weak circulation as shown

by the various dropsies present. Our sheet anchor for this is strychnine and digitalis combined, along with some salt of iron. The complete loss of appetite and inability to digest what is taken, from the changes in the disordered intestines must be treated by food of a simple nature, given frequently in small quantities with pepsine and bismuth. There must be absolute rest. Stimulants should be given along with the food. The treatment is necessarily long and tedious, as may be expected when the changes in the heart, and the intestines, more especially, are considered.

With all possible care in treatment, nursing and rest, however, the results are, as a rule, simply a gradual wasting away, or a sudden end by some complication as dysentery or diarrhoea.

Any complication which may arise must be treated separately, but as a rule, I may say no treatment is of any avail. It is only in the young that one can expect recovery when this stage is reached, and it may be almost with a truth stated that any one passed middle age who has reached this stage cannot recover.

Having gone rather fully into the cause, signs and symptoms, course, prognosis and treatment of ankylostomiasis, I will now give a few details as to the cases treated in the Andamans up to the middle of November 1896.

It has been noted here that this disease is met with amongst convicts who have been many years in the settlement, as well as among new arrivals. The latter have evidently brought the parasites with them, which makes me think that it must be more common in the Indian jails than suspected, that probably it has only to be carefully sought to be found, and that it may be a cause of anæmia in many jails, especially where extramural labour is carried on. Self-supporters living in villages suffer equally with the convicts in barracks if similarly exposed, that is, if they are employed in agriculture. It is no respecter of persons or age, and attacks alike Hindus and Mahomedans, and old and young, where the conditions of life are similar. I have found it here among convicts from Madras, Bombay, Burma, and all over Bengal: some may have brought it with them, but most have contracted it here.

Prevention and Detection.

Means for prevention and speedy detection of the affected are important.

Means of prevention.—I. To a certain extent this is effected by the early treatment of those affected and the destruction of the parasites, so limiting the dissemination of the ova.

II. Careful attention to conservancy arrangements and disposal of nightsoil is one of the most important means of prevention. If it were possible to destroy all filth in incinerators this would of course be the best possible arrangements. As it is impossible at present,

every care should be taken to see that conservancy is specially inspected, and a watch kept to prevent, as far as possible, pollution of ground which is likely to be worked on, as at the tea gardens, or brickfields or ground which acts as catchment area of water-supplies.

III. All water which is used even for domestic purposes as well as for drinking should, if possible, be boiled. When two supplies are kept, one for drinking, the boiled, and one for washing plates, hands, mouth, &c., the unboiled, it is quite a common thing to find the convicts drinking the unboiled and using the boiled for washing purposes. This would be prevented if all was boiled.

Speedy detection and early treatment.—This is very important both for the individual and the community, for the individual because the further the disease is advanced, the less favourable the result of treatment, and for the community because the means of spreading the evil is lessened.

1. Each batch of convicts, immediately after arrival in Port Blair, is to be paraded, and any cases suspected to harbour the dochmius are to be treated.

2. Inspection parades of working files are held at stated periods generally twice a month, and suspicious cases selected from them.

3. In jails and among the invalid and convalescent gangs where regular weighments are made (which is in reality one of the surest tests), any convict who without reason shows steady loss of weight is to be treated.

4. Patients admitted into hospitals for other diseases may with advantage be at the same time treated for ankylostomiasis if suspected. Thymol given as here advised can do no harm to a healthy man nor to any one in the first or second stages of ankylostomiasis, though in a weakly elderly patient, in the third stage far advanced, I have seen the dyspeptic symptoms, the giddiness and debility, &c., apparently aggravated, and it is often necessary to delay giving thymol till there is some improvement though as a rule when so far advanced the case is hopeless. If these rules are regularly carried out, most cases should receive treatment before they are far advanced in the second stage, and a good deal of sickness and mortality should be prevented.

ANKYLOSTOMIASIS AS A CAUSE OF ANÆMIA AND "SPONGY GUMS."

BY WM. GLEN LISTON, M.B.,
CAPTAIN, I.M.S.

I HAVE the honour to submit my report* on the examination of certain cases of so-called scurvy in the Akola Jail in accordance with

* Report submitted to P. M. O., Hyderabad Contingent.

your letter from Akola, dated 25th September 1899, asking me for "an opinion as to the cause, treatment and prevention of the disease."

From my examination I have come to the conclusion that the disease is "Ankylostomiasis" as the following description illustrates.

In hospital there were some ten cases of the disease in different stages of advancement, chiefly, however, well on the road to recovery. Four typical cases were chosen illustrating the various stage of the diseases, and a thorough systematic examination of these cases made with a view to ascertaining the nature and cause of the disease.

It will be best in the first place to describe the symptoms of the disease illustrated by the results of the examination of the four cases chosen for examination.

The course of the disease may be divided into four stages:—

- I. The stage of gradual onset.
- II. The acute stage.
- III. The chronic and relapsing stage.
- IV. The stage of gradual recovery.

The onset of this disease is very gradual. The first symptoms generally complained of are weakness and giddiness. It is in this stage that the patient first comes to hospital. A general examination first calls attention to the expression of the patient. The expression of the face is dull, listless and apathetic. The patient appears to take little interest in what is going on around him. His features are often slightly swollen, especially below the eyes. The body generally is slightly emaciated, although some patients appear plump and stout. Swellings are not, as a rule, detected in the early stages of the disease. The main feature and most striking is the great anæmia. The conjunctivæ are pale, the tongue and lips are also pale and are generally not, in the early stages, swollen. The heart sounds are not much altered, but occasionally a bruit may be heard over the pulmonary area. An examination of the blood shows great deficiency in the number of the red blood corpuscles. The coagulation time of the blood is very slightly if at all increased. The amount of calcium salts present in the blood is not deficient. The alkalinity of the blood is practically normal. The bowels are generally regular, but diarrhoea may occasionally be found. The stools are sometimes well formed, but more often soft, although true diarrhoeic motions are not often found. There is not much noteworthy in the gastric symptoms other than a marked loss of appetite; the tongue too indicates gastric disturbance. The stools always contain the clear transparent ova of the ankylostoma duodenale, and their numbers are in proportion to the severity of the disease.

Example I.

"Dhondya," admitted to jail on 4th November 1897. He had always been a strong and useful worker, but was

admitted to hospital on the 15th October 1899, on account of weakness, giddiness and anæmia. His appetite was much impaired. He had been on ordinary prison diet till his admission to hospital when he was put upon hospital diet. His temperature has been practically normal since his admission to jail; only twice or three times since he came to hospital has he had any fever, and the highest recorded temperature during that time is 99° 8 F. The patient is dull and apathetic. Tongue, lips and conjunctivæ are pale. Tongue flabby, tooth-indented, small deposits of black pigment occur along its edge and tip. The teeth are covered with sordes, and the breath is very foul.

His blood clotted by Wright's method at 25c in four minutes. The red corpuscles numbered 3,220,000 per cubic millimetre. There was no marked deficiency in the number of polynuclear or other white blood corpuscles.

Alkalinity of the blood was neutralized by N. 35 H. 2, So 4; calcium salts not completely precipitated by N. 400 soda citrate solution. No pigmentation of the leucocytes; no malarial parasites detected; no enlargement of the spleen.

Stools contain abundant ova of ankylostoma duodenale.

II.—Acute stage.

As the disease progresses its advancement is as a rule slow. The patient becomes more and more anæmic and weak. Atrophy is now evident, although an abundant and nutritious diet may have been given for some time. At this stage hæmorrhages and effusions are liable to make their appearance; these may be subcutaneous, subserous or intermuscular. The effusions are accompanied by a considerable amount of swelling and tenderness, and there is always a certain amount of heat felt over them in their early stage. The gums may be now swollen and tender; the teeth are covered with sordes, and when cleaned the gums bleed readily. The disease has now assumed a markedly scorbutic type, but, under all these scorbutic symptoms, the great anæmia and its effects are the marked signs. The stools are often loose; diarrhoea and dysentery are liable to develop often with a fatal issue.

Example II.

"Peeria," admitted to jail on 4th November 1897. Observe the very gradual onset by the number of admissions into hospital following close on one another.

First admission, 10-8-98. Dysentery.

Convalescent, 14-8-98.

Second admission, 18-12-98. "Scurvy."

Convalescent, 30-1-99.

Third admission, 9-4-99. "Scurvy."

Convalescent, 5-5-99.

Fourth admission, 21-10-99. "Scurvy."

Remaining in hospital, 28-10-99.

The first symptoms of the disease began nearly a year ago, and he has never been entirely free from the disease, although he has been always on a very liberal diet. He at times appeared to make progress, but relapsed after short intervals. His diet has been the ordinary convalescent diet, with extras in the form of 1½ milk, ½ lb. mutton and wheat bread in place of jawari. His gums on last admission were slightly spongy. No hæmorrhages or effusions in any part had occurred up to the time of his last admission. Bowels are

regularly moved, but the appetite is markedly impaired. The striking feature in the case is the extreme anæmia. The gums, tongue and conjunctivæ are very pallid. The day previous to this examination, a slight subcutaneous hæmorrhage had occurred over the right elbow-joint. This was hot and painful, and the part was slightly discoloured, but the swelling was not so marked as in other cases, where the effusions were intermuscular. An examination of his blood showed the red corpuscles number 2,960,000 per cubic millimetre. The white corpuscles were not deficient in proportion to the red.

The alkalinity of the blood was neutralized by $\frac{N}{34}$ H.2 So4. Coagulability was not prevented by $\frac{N}{400}$ soda citrate solution. Blood coagulated at 25c. in $4\frac{1}{2}$ minutes. There was no pigmentation of the leucocytes. No enlargement of spleen. The temperature had been normal since admission to jail.

The stools showed very many ova of ankylostoma duodenale.

III.—The chronic and relapsing stage.

In the acute stage the disease may continue for some time, the patient ultimately departing life from some intercurrent disease, especially dysentery and diarrhœa. Ulcers never form in any part of the surface of the body even in the worst cases. More often the disease takes on a chronic course, the patient under an abundant diet generally recovers in part, but is liable to frequent relapses, and so the disease may remain for years.

Example III.

"Janoo," admitted to jail on 17th December 1896. First admission to hospital 16th March 1899. General debility.

Discharged, 30-4-99.

Second admission, 13-8-99. Scurvy.

Remaining in hospital, 28-10-99.

This patient has suffered much from bowel symptoms, especially diarrhœa and dysentery.

He has been on hospital diet with extras in the form of $2\frac{1}{2}$ lb milk, $\frac{1}{2}$ lb mutton per diem. His tongue and gums are pigmented and slightly swollen, and his teeth are covered with sordes. He has had for a long time a swelling over the left ankle, which is now gradually subsiding.

The number of his red blood corpuscles per cubic millimetre is 3,960,000; white corpuscles not deficient in numbers. Alkalinity of the blood neutralized by $\frac{N}{40}$ H.2, SO4. Coagulation not completely prevented by $\frac{N}{400}$ soda citrate. Blood clotted in $3\frac{1}{2}$ minutes at 25c. No pigment in the leucocytes; no malarial parasites; no enlargement of the spleen; no history of fever.

The fæces showed a few ova of ankylostoma duodenale.

IV.—The stage of gradual recovery.

Finally, a patient with symptoms of this disease beginning when placed on a very liberal diet may, in a few months, make some progress towards recovery, especially if the constitution was before strong.

Example IV.

"Hurjia," admitted into prison on 8th October 1897. A strong, well-built man, first admitted into hospital 8th August 1899 with swollen gums and sordes on the teeth, with weakness and anæmia. The calf of the left leg was hard, swollen, branny and painful. Under a very liberal diet, such as the other cases were getting, he has

made some progress. The swelling of the ankle and calf of the left leg are much diminished. No signs of hæmorrhages could be detected. No enlargement of the spleen was found. No history of fever. Gums still swollen and pigmented, tongue flabby, teeth—indented and furrowed.

Red blood corpuscles numbered 4,570,000 per cubic millimetre; white corpuscles apparently not deficient and containing no pigment granules. Alkalinity of the blood neutralized by $\frac{N}{80}$ H.2, So 4. Coagulability maintained in presence of an equal bulk of $\frac{N}{400}$ soda citrate solution. A few ova detected in the stools.

Such is a brief account of this disease.

The diagnosis that the disease was ankylostomiasis and not scurvy was arrived at from the following reasons:—

(1) The marked red corpuscular anæmia was much in excess of that found in scurvy.

(2) The presence of the ova of ankylostomum duodenale in the fæces of all affected cases.

(3) The fact that the disease could not be attributed to the want of an antiscorbutic diet.

This was proved by an examination of the diets. Patients did not improve even on such an excellent antiscorbutic diet as the following:—

Potatoes, 3ozs.; milk, 1lb; sugar 1oz.; mutton, $\frac{1}{2}$ lb; onions and pickle, with 2ozs. of country arrack; wheat bread, 16ozs.; dhall, 6ozs.; fresh vegetables, 6ozs.; ghee, $\frac{1}{4}$ oz.; salt, $\frac{1}{4}$ oz.; condiments, $\frac{1}{4}$ oz.

The overseer of works, a native, who lives outside the jail, and who is a well paid Government official with an abundant and ample supply of excellent food, was affected by the same disease.

An examination of the constituents of the blood showed—

(a) that the marked feature in the cases was the red corpuscular anæmia;

(b) that the rate of coagulability was only very slightly longer than normal, and that too in an acute case where hæmorrhage had occurred only the day before;

(c) that the alkalinity of the blood was practically normal in all cases;

(d) that there was no deficiency in the amount of calcium salts.

(4) Purpuric hæmorrhages and ulcerations and the dry condition of the skin in ordinary scurvy was entirely absent in these cases.

(5) The œdema, hæmorrhages and effusions might be accounted for in two ways:—

(a) The great deficiency of red blood corpuscles would cause insufficient oxygenation of the tissues, and thus a fatty degeneration which might affect the vessel walls. Major Reilly, I.M.S., has seen fatty degeneration in the heart muscle at *post mortem*s.

(b) The absorption from the intestine of the toxin which is excreted by the parasite in order to maintain the fluidity of the blood during its sucking operations, when large quan-

ties of these parasites are present (some time amounting to several thousands) a certain quantity of this toxin must be absorbed. In the hæmorrhagic cases the presence of very many worms in the intestine was proved by the very great number of ova present in the fæces. A few remarks may now be made of the characters of the ova found. They were generally oval, clear, transparent bodies with divided yolk, the segments often numbering more than eight, and in this respect alone differing from the ova described by Manson. In one case the young embryos were believed to have been found; they were small ciliated bodies actively mobile, about three or four times the size of a red blood corpuscle. One such ciliated body was found in a sample of the prison well water, after a somewhat hurried examination.

As Manson points out "there may be dozens of ankylostomes in the intestine without any appreciable anæmia or indeed symptoms of any description whatever" an examination of some supposed healthy individuals was made. Twelve prisoners were chosen from various wards. Of these twelve, in two only, were ova found; one of these individuals appeared to be slightly anæmic; but the other looked perfectly healthy. The Hospital Assistant and the Chief Warder were also examined. Nothing was detected in their cases.

The Overseer of work, whose case has already been mentioned in passing as one in which an ample food-supply was to hand, and who lived outside the jail; in this case, there were extensive effusions in the left forearm, and right leg and thigh. In his stools very many ova were found, and it was in his case that the small ciliated bodies believed to be hatched embryos were found. His blood corpuscles numbered 3,700,000 per cubic millimetre.

As to treatment I have had no experience, but that mentioned by Manson seems very reasonable, and has the best reputation; he uses thymol.

ANKYLOSTOMA DUODENALE.*

By C. J. FEARNSIDE, M.B.,

CAPTAIN, I.M.S.

Superintendent, Central Jail, Rajahmundry.

A SYSTEMATIC search for the ova of this parasite amongst the convicts and new arrivals in the Central Prison, Rajahmundry, was commenced in February last. Those examined came from the Northern Circars (Ganjam, Godavari, Vizagapatam, Krishna), also Kurnool and the hilly tracts of the East Coast. The microscopic examination of the stools of new admissions was carried out within a few days after their arrival, and on an average, three slides were carefully gone over.

At the end of a year it is intended to publish the full results, and the information furnished is still incomplete. From the 22nd of February to the 13th of June 1900, 678 new arrivals were examined. In addition to these, more than 300 convicts, who have been confined over six months in the prison, have also been scrutinized. Having a limited time at my disposal, it was only possible, as I mentioned before, to examine three slides. So I feel certain that had more time been devoted to the work, the percentages would be higher.

Of the 678 new arrivals 462 or 68.1 per cent. harboured this parasite. Of 100 of these, taken haphazard between the 20th of April and May 3rd, the percentage affected is 72, a figure somewhat higher than that of the total 678 persons. The percentage of round worms is the same 36, and thus for the purpose of comparison the 100 cases may be taken as a standard. Of the 72 persons affected with ankylostoma 50 (or nearly 70 per cent.) were in good health, 12 (or 16.6 per cent.) were in indifferent health, and 10 (or 13.9 per cent.) were in bad health. Thus 72 per cent. of persons in the Northern Circars harbour this parasite and remain in good health. Nearly 35 per cent. harbour in the bowel simultaneously both ankylostoma duodenale and ascaris lumbricoides.

It is interesting now to compare what are the effects on these entozoa of better hygiene and cleaner food in our prisons. I have attached the analysis of 200 convicts who have served over 6 months in prison. The percentage of ankylostoma has dropped from 72 per cent. to 58 per cent., and that of ascaris lumbricoides from 36 per cent. to 18.5 per cent. When the enquiry is finished at the end of a year I am of opinion that the results will be much the same as those just mentioned.

Of 105 *post mortems* done by me in the prison 74.3 per cent. revealed the presence of this worm, 51.9 per cent. shewed congested areas, from one to several centimetres in diameter, in the bowel, and 11.4 per cent. disclosed small erosions and ulcers about 1-2 mm. in diameter.

These figures as well as the experience gained in the jail after three and-a-half years go to show that the effects of the ankylostoma are for the most part secondary and not primary. They seldom occur in such numbers as to cause true ankylostomiasis. I feel convinced that many cases of ankylostomiasis are not the result of the ankylostoma primarily, but of such disorders as malaria, dysentery, &c. The presence of ankylostomata in malarial or other cathexias is of great importance. They bleed the patient who can ill afford to lose the blood, and set up local congestions and erosions of the bowel which cause a catarrh and thus retard the proper assimilation of the food and recovery of the patient. It is this secondary effect of ankylostoma that I look upon as most injurious.

* Written for this Inquiry, also sent to B. M. A. meeting Ed., I. M. G.

A word now about thymol. Many are enthusiastic about this drug and think that it acts like a charm. Observers speak of washing the stools and finding hundreds of dead ankylostomes after administration of the drug. I have seen dead ankylostoma in the bowel, and it is by no means easy to say that they are dead ankylostoma, so like are they to decomposed tissues of meat, vegetable or husk of grain. I do not trust this form of investigation of stools by washing them, &c. I prefer the simple plan of microscopic examination of the motions a few days after the administration of the drug. I attach thirteen cases who have been consuming large doses of thymol for varying periods from ten to sixty days, who were frequently purged, and who at the end had as many ova of ankylostoma in their stools as at the beginning.

8. For the diagnosis of ankylostomiasis, therefore, it is necessary to exclude all other blood-destroying diseases rather than depend on the mere presence of the parasite in the bowel.

Analysis of 678 convicts whose motions were examined on arrival from 22nd February 1900 to 13th June 1900.

	Ankylostoma Duodenale.	Ascaris Lumbricoides.	Trichocephalus Dispar.
Number of cases in which ova was present ...	462	245	51
Percentage ...	68.1	36.1	7.5

Analysis of 100 convicts whose motions were examined on arrival from the 20th April to 3rd May 1900.

	Ankylostoma Duodenale.	Ascaris Lumbricoides.	Trichocephalus Dispar.	Ankylostoma Duodenale and Ascaris Lumbricoides associated in the same individual.
Number of cases in which ova was present ...	72	36	12	25

State of health of 100 convicts in whose motions ova of Ankylostoma were found.

	Good health.	Indifferent health.	Bad health.
Number of cases in which ova was present ...	50	12	10

State of health of convicts unaffected by Ankylostoma Duodenale.

	Good health.	Indifferent health.	Bad health.	Number unaffected by any parasite.
Number ...	14	10	4	17

Analysis of 200 convicts who have served 6 months and upwards.

	Ankylostoma.	Ascaris Lumbricoides.	Trichocephalus Dispar.
Number of cases in which ova was present ..	116	37	10
Percentage ...	58.0	18.5	5

Analysis of 105 post mortems carried out in Rajahmundry Central Jail.

Cause of death.	Number of deaths.	Ankylostoma Duodenale.	Hæmorrhagic spots.	Erosions.
Dysentery ...	29	25	18	8
Diarrhœa ...	12	11	7	...
Ague ...	14	2	9	2
Pneumonia ...	17	14	10	...
Tubercle of lungs ...	8	7	5	...
Valvular disease of heart ...	5	4	3	1
Disease of liver ...	3	2	2	...
" of kidney ...	13	11	9	1
General diseases ...	4	2	2	...
TOTAL ...	105	78	65	12
Percentage ...	...	74.3	51.9	11.4

List of convicts affected with Ankylostoma treated by Thymol and occasional purgatives.

Number of convict.	Period treated by Thymol.	Dose of Thymol daily.	REMARKS.
994	Days. 10	Grains. 20	Ova as numerous at the end of treatment as at the beginning.
970	17	20	
9,635	27	20	
767	24	20	
1,305	15	30	
9,708	30	20	Second period of treatment.
629	30	20	
774	30	20	
743	30	20	
9,708	30	30	
9,711	30	30	Second period of treatment. Ditto ditto.
774	30	30	
743	30	30	

NOTE ON THE PREVALENCE OF ASCARIS LUMBRICOIDES IN THE DARBHANGA DISTRICT.

By J. T. CALVERT, M.B. (LOND.), D.P.H. (CAMB.),
CAPTAIN, I.M.S.

THE great prevalence of round worms amongst the inhabitants of this district is known to all who have served in it, since it is not unusual for half of the total number of dispensary patients to attend for this disease alone. With a view to get some exact figures for the District Medico-Topographical Report, recently, all prisoners newly admitted to the district jail were put through a course of *santonin*. As a result amongst the first 150 who were examined, no less than 53·33 per cent. were found to harbour round worms in varying numbers. Further 2·17 per cent. were found to be infected with the *tænia solium*, and 6·17 per cent. with the *oxyuris vermicularis*, leaving only 37·33 per cent. free from these parasites.

In the above no account is taken of the prevalence of the *ankylostomum duodenale*, as it is intended to make a separate investigation under this head. It may, however, be noted that the ova of this parasite were found in every case of non-malarial *anæmia* in which search was made for them. In view of the above it would seem to be as essential to put every newly admitted prisoner through a course of anthelmintics as it is to give him a bath and a change of clothing prior to his admission to jail.

A NOTE ON THE SUPPRESSION OF CHOLERA IN A FAMINE CAMP.

By J. A. CUNNINGHAM, M.D.,
MAJOR, I.M.S.,

Civil Surgeon, Delhi.

AN outbreak of cholera was reported amongst the people on famine relief work in the Delhi District at Kalka Ji, about eight miles out of Delhi, on the Delhi-Muttra road.

These people numbering 2,564 were employed in making the embankment for the projected Delhi-Muttra Railway.

The first attacks of cholera occurred on the night between the 9th and 10th April, two people being stricken, the wife of a sweeper and the child of another, belonging to the same working gang of sweepers and *chamars*, about 500 strong.

This gang was imported from Rohtak in December, and cholera has been more or less prevalent in the Rohtak and Hissar Districts for several months. It is well known that there is constant intercommunication between such a gang of people as this, and their relatives at home, individuals coming and going, and no more

likely way could be found for spreading the disease amongst such a gang as this, than by the clothing, or earthenware vessels or even the *fecal* discharges of a person who has recently recovered from the disease.

From whatever source the infection at Kalka Ji was derived, it was spread in a most effectual manner, as by 12 o'clock noon on the 12th April, two and a half days after the first two attacks occurred, 78 persons, all belonging to the same gang, were attacked and fifteen had died.

This famine camp was originally in medical charge of a Hospital Assistant, but immediately on information reaching me, I sent an Assistant-Surgeon to assume charge, furnishing him with detailed instructions regarding segregation, disinfection and protection of the water-supply, &c. Several vaccinators were also deputed for duty to assist in managing the cholera camp, watching for fresh cases, &c., &c.

On my first visit to the camp on 12th April I found the sick segregated in a well-arranged hospital camp, and I arranged that those in attendance on their sick relatives should be as carefully segregated as the sick, that these as well as those who recovered from the disease should have a phenyle bath and get all their clothing and belongings thoroughly disinfected before they returned to the works. For this purpose a large boiler was provided, and quantities of phenyle, carbolic and perchloride of mercury and McDougall's powder.

Prior to the outbreak water was drawn from selected wells by bullocks and *charsa* and stored in large iron tanks provided with taps close to the wells, the water was drawn from these tanks into water-barrels, also provided with taps; the barrels were then taken round the camps in bullock carts, and the vessels of the workers filled from them.

Several gangs of workers were supplied in this way from the same source of water, and as the disease broke out in one gang only, the infection did not come from the source of supply, but must have gained access during distribution, or have been obtained from some supplementary source of supply which had got poisoned.

All the wells, tanks and barrels in use throughout the camp were treated with a strong solution of permanganate of potash, and a strict watch was maintained to prevent the possibility of any of these sources of supply being contaminated by the drinking vessels or the hands of any but the persons told off to draw water. All the tanks and cattle-drinking troughs in the neighbourhood were emptied of their stagnant water and treated with quicklime, all the surrounding village wells were treated with permanganate of potash, and intercommunication between the villagers and the workers was prevented.

The site of the camp of the infected gang was moved on about half a mile further on the work, and most important of all, new earthen vessels were issued to each worker in exchange for their old soiled vessels which were broken up—poor people generally use unglazed earthen vessels for all domestic purposes, including cooking, and porous as these are they readily become infected and form excellent breeding grounds for disease germs.

So successful were these arrangements in stopping the outbreak that no fresh cases occurred after the 18th April. On the night of the 9th April the first two cases occurred, on the 18th the last two, and between these dates 105 cases with 39 deaths occurred.

Dates of attacks and death.

	Attacks.	Deaths.
10th April	43	8
11th "	30	3
12th "	5	8
13th "	6	3
14th "	12	3
15th "	4	2
16th "	3	4
17th "	0	0
18th "	2	2
After 18th "	0	6
TOTAL	105	39

I am inclined to attribute the smaller than usual percentage of deaths here to the fact that the patients were under treatment from the beginning.

Another sharp outbreak of cholera occurred in one of the suburbs of the Delhi city, Pahargunge, which is inhabited chiefly by poor people of low caste; the population is about 14,000.

This outbreak came first to notice by the police finding one dead body and two people suffering from the disease under a tree on the road-side on the 5th June. Investigation elicited the information that eleven people were attacked and five had died between the 4th and 7th June in this locality with symptoms resembling those of cholera. An Assistant-Surgeon, a Hospital Assistant, and several vaccinators were placed on special duty to combat this outbreak; all the wells in the vicinity were treated with permanganate of potash. A Kahar with an iron *dhol* was placed on each of the five principal wells from which drinking water was obtained, and no private person was permitted to draw water from the wells in his own vessels. Arrangements were made to substitute new unglazed earthen vessels to all the inhabitants of the infected locality, their old ones being broken up. These arrangements were so satisfactory that no new cases occurred after the 9th June.

Up to the 7th	there were	11 cases and	5 deaths
" " 7th	" "	5 new cases,	4 "
" " 8th	" "	2 "	2 "
" " 9th	" "	1 "	0 "

Altogether there were nineteen cases and eleven deaths. Had no steps been taken to destroy the brood of cholera germs on which this outbreak depended, the week succeeding the 9th June would in all probability have seen some hundreds attacked, and the following week many hundreds. The disease would probably have spread rapidly all over the city, where many of its 200,000 inhabitants who are crowded in unhealthy, insanitary, ill-ventilated, badly drained streets and houses would doubtless have succumbed.

A large proportion of the poorer classes all over this country are at present in a typical condition, predisposing them to attacks of cholera, owing to their being half-starved and suffering from indigestion brought on by eating coarse unwholesome food, which, in a plentiful year, would not be used for human consumption.

Immediately the disease appeared in Delhi, all the principal and most popular drinking wells were treated with permanganate of potash. The custom prevailing in Delhi regarding drinking water is somewhat peculiar. A good water-supply obtained from percolation wells in the bank of the Jumna is supplied by pipes to most parts of the city and suburbs, but the conservatism of many of the inhabitants prevents them from drinking this pure water, and these resort to wells. Again, in the very hot weather, the water from the pipes is tepid, and unless it is stored for a time in porous vessels, it is not so pleasant to drink as the cool water from wells. This drives many people to drink well water and prejudices them in its favour. Fortunately, however, the water in most of the wells in and around the city is brackish and unpalatable, and particular sweet wells, chiefly those situated near the Jumna canal, are resorted to for drinking water. To and fro these wells, streams of hand carts, bearing each a number of copper or earthen *gurrahs*, wend their way through the city daily.

When these wells were first treated with permanganate of potash, which left a slight tinge of colour in the water for the first day or so, considerable opposition was displayed. The people ceased to use the water of even the most popular wells for some days at first, and agitators of evil disposition, of whom in a large city in this country there are generally many, spread disquieting rumours, calculated to deceive and prejudice the ignorant. It was rumoured that the authorities had poisoned the wells with the deliberate intention of killing off the people.

It was even ingeniously said that blood had been added to the water in order to destroy the caste of the people.

I am convinced that these rumours were not the result of the imagination or the industry of ignorant people, but of interested agitators, and their identification should be the aim of the political authorities.

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It is discouraging when our best endeavours in the peoples' interests are thus misrepresented and misinterpreted.

In every little outbreak of cholera that has occurred in this district during this summer, the procedure above described has been carried out with more or less detail; a medical subordinate or vaccinator was sent promptly to each infected village with a sufficient supply of permanganate to disinfect all the wells, and the result has been ideal.

Cholera has prevailed all around this district ever since April in Rohtak, Hissar, Gurgaon, Rajpootana, &c., the city and district are in constant communication with all these places by rail and road, and, as would be expected, no less than 26 different towns and villages in this district have already been attacked by the disease, yet the total number of attacks has been only 391 and the deaths 213 up to date. The disease has succeeded in making headway in not a single instance.

It is the hope that this experience may be of use to others that impels one to make this report at the present time.

REPORT * ON CHOLERA EPIDEMIC IN THE TOWN OF MUZAFFARPUR DURING OCTOBER AND NOVEMBER 1899.

By E. HAROLD BROWN, M.D.,
MAJOR, I.M.S.,
Civil Surgeon, 24-Pergunnas.

TOWARDS the end of September 1899 I heard rumours of cases of cholera in the Chandwara and Kalliani wards of the town of Muzaffarpur. The police had not reported any, and on my making enquiries, they said that, to the best of their knowledge, none had occurred. Being convinced, however, that there had been some fatal cases, I made a house-to-house inspection in Chandwara and Kalliani, with the result that several people were discovered suffering from the disease, and, in addition, there was distinct proof that several fatal cases had occurred, which had not been reported. I represented the matter to the Magistrate and the District Superintendent of Police, with the result that the head-constables of each outpost in the town were ordered to send me daily cholera reports every morning, and from the 4th October these were received regularly though at first they were far from complete.

I continued to make house-to-house inspection and to see every case that was reported, frequently discovering some that had been suppressed, the people being afraid, at the outset, that those suffering from the disease would be removed by force.

When they realised the fact that my inspections were for the object of treating the sick, and not of taking them away, the friends were reassured, and it was then most unusual for a case to occur and not to be reported.

There was not time to make notes of all the cases thus seen and treated by me, as there was so much to do both day and night, and, until the arrival of Hospital Assistant Shahoodal Huq (who was sent on special cholera duty) on the 8th October no careful records were kept. From that date till the end of the epidemic, however, very careful notes were made, and they constitute the bulk of the report.

As such a long interval had elapsed between the occurrence of the first case and my knowledge of the fact that the disease was prevalent, it was impossible for me to trace the original source of infection; cholera prevailed in several places in September, notably in Muzaffarpur, Paru, Hajipur, and Lalganj thanas, and might have been introduced from any one of these; but I was absolutely unable to trace any connection.

On the 4th, the police report showed 18 attacks with 11 deaths, Chandwara being responsible for most. On the 13th, the figures were 18 attacks, 14 deaths, 48 remaining. On the 20th, 21 attacks, 10 deaths, 43 remaining. On the 23rd, 23 attacks, 14 deaths, 45 remaining. On the 1st November the figures were 24 attacks, 16 deaths, 38 remaining, this being the largest number of fresh cases of deaths in any one day; the epidemic slowly declined subsequently, till on the 8th there were 5 attacks with 3 deaths, and on the 23rd, for the first time, there were no fresh cases to record.

At first the disease was limited to the natives in the town; cases frequently occurred among the domestic servants in the employ of Europeans, there being three in my own compound, and fifteen among the boys and servants in the American Methodist Orphanage for males.

On the 28th of October, however, there was an outbreak among the Europeans, very limited as regards geographical distribution, and confined to those who drank the water drawn from the well in the Planters' Club compound. On the 26th and 27th there were cases among the servants (bearers, syces, and grass-cutters) employed at the Club; they, beyond any possibility of doubt, infected the well above referred to, and on the 28th there were four cases of undoubted cholera, all adult male Europeans, who had taken drinking water from the well. Two of them were living at the Planters' Club at the time; two others lived in a house a short distance from the Club, their supply of drinking-water coming from the latter place, and all these four were visitors to the town. A fifth case was a European child, aged 14 months, who, with its sister and parents, had been staying at the Club, which they all left on the evening of the 27th the little one developing symptoms of cholera,

* Communicated by Director-General, I.M.S.

36 hours later, and dying of collapse at a place many miles away. There were no cases of cholera among the Europeans in any other part of the town, though diarrhoea was strangely prevalent in two houses, and nearly all those who were living at the Planters' Club at the time had diarrhoea, some in a very severe form.

The water-supply of the town consists almost entirely of wells, only a small portion of the inhabitants of Chandwara using water from the river. The supply for the jail was obtained from the river at Chandwara, but on the occurrence of the outbreak, I changed the site to a point a mile and-a-half further upstream, above all possible source of contamination, and it was satisfactory to find that cholera did not appear among the jail population.

On the 2nd October the work of disinfecting with permanganate of potash all the municipal wells was begun, and whenever the owner of a private well asked to have his similarly treated, it was done. Three hundred and eighteen wells being treated in all. On the 29th I disinfecting the well in the compound of the Planters' Club, had the well closed, and the Club evacuated and disinfected.

Of the five cases among Europeans, three occurred in the town, two ending fatally; the other two developing after the patients had left the town, and both being fatal.

The treatment adopted for the disease was prevention, *e.g.*, disinfection and incineration of the dejecta, but there were very grave difficulties in the way, as the people could not be made to understand the extreme necessity of these measures, and neglected, as a rule, to take the most ordinary precautions. Thus I have seen a mother receiving her child's dejecta in her hands, and she smiled when told of the risk she was running; I have no doubt she did the same thing on several occasions, and was not surprised to find her attacked a couple of days later. Disinfectants were freely distributed to all houses and huts where cases occurred, and the people were taught how to use them; but our efforts in this direction were not very successful, nor did they see the sense of burning infected clothing and bedding. If a well was ordered to be shut up, they did not, as a rule, drink the water from it until it was disinfected, and they believed implicitly in the efficacy of the treatment of such wells with permanganate of potash.

The measures adopted to check the epidemic were careful daily sanitary inspections of the town, care being taken to have both public and private thoroughfares and dwelling-houses as clean as possible.

The wells were thoroughly disinfected with permanganate of potash, and when several cases could be traced to a certain well, it was closed; the inhabitants of the post being advised to get their supply of drinking-water elsewhere.

Homeless and destitute people struck down with the disease were removed to the hospital for treatment, but no cases that could be treated and looked after in their own houses were forcibly taken to hospital.

The total number of cases reported by the police was 662, but this, as before remarked, was considerably under the actual number of attacks; of this number, 392 or 59.20 per cent. proved fatal—a very high mortality, which proves that the epidemic was of an unusually severe type.

From the 8th of October, 347 cases were treated by myself (comprising several thousands of visits) and my assistant, with 119 deaths or 39.29 per cent., whereas among the remaining 315 treated by other practitioners or untreated, there were no fewer than 273 deaths, a startling mortality of 86.66.

The 347 treated by us were divided as follows:—

Men,	196,	deaths 50=25.51	per cent.
Women,	101,	45=45.45	"
Children,	50,	24=48.00	"

In the cases treated by us were included all the patients who received medicine at our hands, no matter in what stage of illness they were found; and many of them, especially children were moribund and hopeless, in a stage of extreme collapse; yet, having been put on our list, they were shown as treated, and hence swelled the death-rate. If these moribund cases were excluded, the mortality among those treated by us would be very much lower.

An instance may be given where a fair number of cases occurred under favourable circumstances, *e.g.*, where each patient could be carefully nursed and attended to, and the results were remarkable. In the Methodist Episcopal Male Orphanage, presided over by the Revd. Mr. Jackson, thirteen cases occurred, *viz.*, eight boys, four women, and one man; each patient was most carefully looked after by Mr. Jackson himself, assisted by his staff, and I paid frequent visits to the sufferers: the result was that there were only two deaths, the first fatal case being in a woman who went safely through a severe attack and was doing well: being thirsty, late at night, she drank a large quantity of water which excited vomiting afresh, the patient dying of exhaustion: the other was a weak, delicate boy who died on the fourth day.

The death-rate per cent. here was only 15.38, and in other places equally good results were obtained, provided the treatment and the requisite nursing were carefully carried out. In my own compound there were three cases, all of which recovered; in a private house in Kanhowli there were also three cases, with the same successful results; there were several other similar instances. Where treatment was continued more or less thoroughly, the results were good; but, as will happen among the ignorant

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poor classes, where everything was left to fate, the mortality was painfully high.

The treatment adopted was simple; oil of eucalyptus was the only drug employed, and it was given in doses of ten minims every quarter of an hour, and then hourly, a spoonful of milk being the vehicle in which it was administered. For children the dose of eucalyptus was from one to three drops, and the first effect of the drug was to stop vomiting almost at once, or in a very short time, the effect on the diarrhoea being later, but still very manifest.

Cramps were treated with friction with dry ginger, and friction of the abdomen and loins with mustard oil was also practised.

During the stage of collapse, warmth to the body and extremities, by means of friction, blankets, hot-water bottles, hot sand, &c., was insisted on, and later dry cupping was resorted to when the secretion of urine was suppressed, eucalyptus being given, at longer intervals, throughout.

We noticed very few cases of secondary fever, and I did not observe any cases of the disease in pregnant women.

I do not regard eucalyptus as a specific, but have had far better results with it than with any other drug: it plays the three-fold rôle of an antiseptic, a stimulant, and an antispasmodic, thus fulfilling the three indications of treatment. I have not employed opium in any form in the treatment of cholera for more than twelve years, and am of opinion that from a physiological point of view it is distinctly contra-indicated.

I have employed the treatment of cholera with eucalyptus since 1887, and have almost always had good results. In 1889 I contributed an article on the subject to the *Indian Medical Gazette*, and in 1896 had excellent results in a wide epidemic in the town of Darbhanga. One of its greatest recommendations is its simplicity. The oil is put up in half-ounce bottles, one of which is given for each case of the disease, and several dozens of these were distributed to the police outposts, so that the drug was within the reach of everyone. Our patients were chiefly of the poorest classes; most of those who could afford to pay even a small fee sought the advice of homœopaths or other practitioners, but the results at their hands were exceedingly bad; and there is no doubt the poor had great faith in our remedy, for they came for it at all hours of the day and night.

I received very able assistance, at an exceedingly trying time, from Hospital Assistant Shahoodul Huq, who worked hard and well, carrying out my instructions carefully, and taking very great interest in the work, besides making notes of most of the cases.

Since writing the above, I have been informed, on good authority, that fatal cases occurred early in September, and that the first person attacked was a boatman, who arrived at

a ghat at Chandwara; several cases occurred near the ghat where this man was attacked before the disease spread. My informant can be relied on, but was, unfortunately, away from the station while I was writing the report, and has only just told me of the first case

THE TREATMENT OF SKIN DISEASES IN FRANKFURT (NOTES FROM DR. KARL HERXHEIMER'S CLINIC AND POLICLINIC.)

By W. D. SUTHERLAND, M.B.
CAPTAIN, I.M.S.

As so many of our dispensary patients in India suffer from venereal and skin diseases, it seems to me that a short account of the methods of treatment followed in Dr. Karl Herxheimer's Clinic and Polyclinic here—the second largest in Germany—may be of interest to my confrères in India, and of service too: for—unlike the methods of treatment followed in England though there be—the results obtained are excellent as I have had ample opportunity of satisfying myself.

To Dr. Herxheimer and his assistant in the Polyclinic, Dr. R. Hildebrandt, my best thanks are due for the courteous way in which they showed me the cases and the trouble which they took to give me full information regarding methods and formulæ, &c.

Gonorrhœa.—In the male the disease is treated with five injections daily of a 1—3,000 solution of Arg. Nit., if the anterior urethra be the seat of disease; if, however, the posterior urethra be affected it is treated with injections of a 1—100 solution, which are given once every second day by means of a catheter and syringe, Guyon's catheter and syringe being a convenient form of instrument for the purpose. So soon as the point of the catheter reaches the deep urethra, a few drops of the solution are injected, and then the catheter is pushed on for a little distance, and a few more drops are injected, and so on till the whole deep urethra has been treated.

Each out-patient is given two object glasses, between which he brings twice a week the morning drop of discharge for microscopic examination. The discharge is rapidly dried in a spirit-lamp flame, stained with methylene blue, washed, dried and examined, under a high power, as to the presence of gonococci.

When on three successive days these are found to be absent (*i.e.*, for a week and a half), the case is considered to have become reduced to one of simple urethritis and instead of the Arg. Nit., Zinc Sulph Solution 1—300 is injected, at first five times daily, and then, as the discharge becomes less and less, three times daily, and finally once a day.

In the female the disease is treated by injections of Pot. Permang. Solution (1—3,000) made three times a day; or Sol. Zinci Permang. of the same strength.

In two of Dr. Herxheimer's wards in the Municipal Hospital, are confined those prostitutes who are found to be suffering from venereal disease, they being examined by the Police Surgeons twice weekly. Should a prostitute suffer from gonorrhœa she is considered to be a focus of contagion until for ten days no gonococci have been found in the discharge, and so long as there is a possibility of contagion, she is kept in hospital, conformably to the sanitary laws of this erstwhile free city.

In the Gynæcological Policlinic of Dr. Gottschalk, in addition to the treatment by injections of a solution of Pot. Permang, cases of gonorrhœa in women are treated by the vagina being well swabbed out with corrosive sublimate solution (1—3,000) twice a week.

Syphilis.—For an ordinary exanthem mercury is administered by (1) intramuscular injections of 1½ gr. of Hydrarg. Salicyl., made in the gluteal region once a week, the drug being suspended in a Pravaz syringe full of olive oil; or (2) inunctions, repeated daily, or 60 gr. Ung. Hydrarg., the sites chosen being the upper arms, forearms, flanks, thighs and calves of the legs. One injection is reckoned as equivalent to four inunctions, and thirty-two inunctions or eight injections are taken to be a "cure," which is repeated in four months' time, and so on until two years have elapsed from the beginning of the treatment—for here Fournier's plan of intermittent treatment finds most favour.

Where papulo-hypertrophic syphilides, or gummata are present, Pot. Iod. is also given; but never in the same way as is so frequently done in India, in combination, i.e., in a mixture, with a salt of mercury.

The K.I. is always given alone, and always in fair doses, 450 grains in the twenty-four hours being a not uncommon dosage, reached of course by gradually increasing the dose. Iodism is considered to be an indication that the dose which the patient has taken should not be increased; but not that the exhibition of the drug should be suspended.

Ring-worm.—For this, A—Chrysarobin-Traumaticine is daily painted on the affected spot. This causes sooner or later a dermatitis, and then the chrysarobin-painting is stopped, and lotio zinci is painted on once or twice daily.

Chrysarobin-Traumaticini.

R
Chrysarobini ... gr. 150
Traumaticini ... } 5 iii
(=Sol. Gutta-percha 1 in chloroform 8)

or B—Paraform-Collodion* is painted on for four or five days, and then vaseline rubbed into the now somewhat inflamed affected area. Of all the parasitocides, Paraform, which is a derivative of Formaldehyde, appears to be the most effective.

* Paraform-Collodion.

R
Paraform ... gr. xxx
Grind well
Sp. Æther ... m. xxx
Then add Collod. Flex. ... 5 ss

Keep in a glass-stoppered bottle, with a glass brush attached to the stopper.

Eczema.—When there is much inflammation this is first treated by compresses, wetted every three hours, of—

R
Liq. Alum Acetic ... partes 3
Aq. ... " 97

the compresses being covered with gutta-percha tissue.

Generally by the second or third day the acute inflammatory symptoms have disappeared and then further treatment can be carried out as under.

When the more inaccessible parts of the body are affected, lotio zinci** is painted on twice daily, or oftener.

For the other parts, zinc paste is thickly smeared over the affected part, the paste being then covered with a layer of cotton-wool, fixed by a light bandage. Each day more paste is laid on the old paste, the cotton-wool being changed.

Zinc Paste.

R
Zinci Oxid. ... aa partes 10
Amyl. Trit. ... " 40
Vasellini ... " 40

As the disease disappears, some Ol. Cadini (at first 1%) is added to the paste to stimulate the skin to healthy action.

Where lotio zinci has been used, this gradually gives place to a solution of tar, of which the best form is the Liq. Carbonis detergens. This is painted on the spot once daily.

For eczema rhagadiforme the following is found to be a very useful paste—

R
Emp. Diachyli ... partes 10
Ac. Salicyl ... " 2
Vasellini ... " 88

The paste, or the precipitate from the lotion, is removed with oil or spirit, for no water is allowed to touch the affected parts, which must be cleaned with oil and spirit only.

** Lotio Zinci.

R
Zinci Oxid ... 5 i
Glycer. pur. ... 5 jss
Ferri ox. rub. ... gr. iii
Aq. Ros. ... 5 iijss

Internal medication for eczema is considered to be absolutely useless.

Psoriasis.—Internally arsenic is given either (a) in pills containing $\frac{1}{4}$ gr., three pills being taken to begin with, and each day one more being taken until the daily dose reaches twenty pills; or (b) by *intra venous* injections by a solution made by boiling the drug with water. At each injection only $\frac{1}{2}$ cc. of fluid is injected into the median vein; therefore, as the daily dose of the drug must be increased, solutions of ever-increasing strength are employed, a solution containing $\frac{1}{4}$ gr. in $\frac{1}{2}$ cc. being that first used.

Stomach and bowel disturbances have not been noticed during a course of intravenous injections, which of course can only be carried out in hospital.

Externally the spots are painted with Chrysarobin-Traumaticine or a solution of Ac. Pyrogallic in spirit.

R
Ac. Pyrogall. ... gr. 50
S. V. R. ... m. 1,000

In either case the spots are painted once every second day or so.

Acne rosacea.—The affected parts are rubbed with a solution of potash soap in spirit every night, and then with a soft rag dipped in hot water. The resulting lather is allowed to remain for five minutes, and is then washed off.

In addition to this treatment, the parts are twice a week smeared with this salve:

R
Naphthol β ... partes 10
Vaselini ... " 40

The salve is left on for twenty minutes and then removed—in greater part with a spatula *ad hoc*, and further with a dossil of lint soaked in oil.

(To be continued.)

A Mirror of Hospital Practice.

RENAL SURGERY IN KASHMIR.

By JOSHUA DUKE,
LIEUTENANT-COLONEL, I.M.S.,
Residency Surgeon in Kashmir.

CONSIDERING the enormous preponderance of cases of stone in the bladder prevalent in India, and its extensive removal by litholapaxy, it is curious that stone in the kidney is comparatively rarely met with; and Surgeons in this country do not appear to have the same opportunities of exploring the kidney that are enjoyed by their confrères at home. When Mr. Henry Morris, the great pioneer and

exponent of kidney surgery in England, was House-Surgeon at Guy's Hospital, 1867, I had the honour of being dresser at that institution; but during my period of studentship I cannot recall seeing a kidney cut down on, nor, unfortunately have I ever seen this operation performed by a skilled Surgeon. In Indian civil and hospital practice, however, one has to take every case that comes to hand. As bearing on this subject since my case of nephrotomy performed for neuralgia of kidney, and published in your journal in 1895, though I have performed litholapaxy many times, the two cases quoted below are the only ones that have occurred in my practice.

Case I.—Nephrolithotomy.—The patient, a sepoy in the Imperial Service Troops, Kashmir, came before me at an annual Invaliding Board in December 1898. He then complained of severe pain in the right hypochondriac and lumbar regions. This pain he said rendered his life a burden to him, and he could serve no longer as a soldier. Enquiry proved that he had previously undergone an operation at Gilgit for the relief of this pain, and he showed a scar in the right loin. He was, therefore, admitted to hospital for further examination and operative treatment. I then wired to the Agency Surgeon, Gilgit (400 miles distant), enquiring whether the man's statement was correct. He replied by wire, that an operation had been performed; the kidney manipulated; but no stone was found.

Owing to the kindness of Major J. R. Roberts, I.M.S., F.R.C.S., I am able to give the patient's previous history and a note on the primary operation.

Previous history and operation.—Sepoy Ram Dhun, et. 28, was admitted to the Military Hospital, Gilgit, on 23rd January 1899.

He complained of pain in the right loin. Sometimes this pain was situated in the loin, at other times over the sacro-iliac joint, radiating to the other side.

The urine contained *albumen*. As the case progressed, the amount of albumen varied from one-eighth to one-sixth, sometimes almost disappearing. There was no blood.

About the middle of April he began to have pain radiating from the loin into the right groin and testicle. As the case did not improve under treatment it was decided to explore the kidney, in the supposition of stone, although the amount of albumen in the urine was not in favour of this.

No. 1 Operation, 8th May 1899.—The usual oblique incision was made in the right loin, and the peri-renal fat exposed. This was stripped off, and the anterior surface and the hilum exposed to the touch of the finger. The kidney was judged to be small, and no prominence could be made out on any part. The posterior surface and ureter were also explored. It was not judged necessary to try the needle. Deep catgut sutures were placed in the muscles and a drainage tube in the wound, which healed without any complication.

Subsequent progress.—After the operation there was an interval without pain in the loin, but this symptom returned.

The patient was sent back to Kashmir and Jammu, leaving Gilgit 16th June 1899.

On August 24th, at Jammu, the condition of the urine is noted as follows:—

Sp. Gr. ... 1026
Albumen ... $\frac{1}{4}$
Lithates in abundance.

He was re-admitted to Jammu State Hospital on December 26th, 1899.

Symptoms then severe and almost constant pain in the right hypochondriac region and in the right loin. The pain was aggravated by pressure before and behind. Urine normal in every respect.

No. 2 Operation, January 1st, 1900.—The right loin was opened for the second time. The incision was now made parallel with, but fully half an inch posterior to the primary scar. The renal fat was exposed, some torn out, and the kidney brought well into view. Careful palpation revealed nothing.

Needling was then commenced, and six punctures were deeply made in various positions. Nothing could be felt, and I began to despair of finding anything. At the seventh puncture, however, made from below upwards, a stone was felt and then struck on audibly. A deep incision was then made and a Thompson sound passed. This at first entered the ureter, running easily; it was then withdrawn, turned up and struck the stone in the upper calyx of the kidney with a metallic noise. The opening was then enlarged free bleeding ensuing. The finger was now passed into the hilum on to the stone. The calculus, however, was firmly adherent, and its pointed apex imbedded, so that it had to be slowly peeled off and loosened. It was then removed with forceps.

After the hæmorrhage, controlled by sponge pressure, had ceased, a drainage tube was inserted, and the wound firmly closed.

The stone weighed, on removal, 36 grains, and was of the size and shape as depicted.



Subsequent progress.—The patient did well, though a good deal of blood was passed with urine, a symptom which continued until the ninth day.

January 15th.—The drainage tube which had been frequently shortened was taken out and the sutures removed—slight sweet discharge. Urine contains mucus and lithates, but no blood or pus.

February 1st.—Wound soundly healed, patient up and about.

The points of interest in this case are (a) the presence of a large, though transient, quantity of albumen; (b) that simple manipulation failed to discover the presence of a calculus.

Case II.—Nephrotomy.—Nikab, Hindu male, *æt.* 35, admitted 16th March 1900.

Previous history.—Ten years ago had an acute attack of pain in the left lumbar region which lasted for twelve hours, and was relieved by taking a warm drink prescribed by a native physician. The pain was associated with a sensation of something rough passing down from kidney, and patient thinks his left testicle was drawn up. Three years later he passed some sand and gravel with his urine. Four years subsequently he had another attack of lumbar pain similar to the first. No history of hæmaturia, or definite pain, and drawing up of testicle. Has never had retention of urine. His general health had failed since these attacks.

Present symptoms.—Marked tenderness on pressure over the lower border of right kidney below the rib, the patient wincing when the thumb is pressed in. The pain is increased when the hand is placed over the

abdomen and pressure made from behind. He complains of a sensation of something rough moving in kidney region.

The above are the only symptoms. Urine Sp. gr. 1029, healthy in every way.

Operation, 20th March 1900.—The kidney was exposed in the left lumbar region by an incision four inches in length; about two inches of peri-renal fat was removed and the kidney brought into view, but not outside the loin. On drawing the lower end of the kidney into the wound a small cyst size of a pea was seen. This was needled and a little yellow serum let out. On passing the needle in deeper, some more of the same serum, almost pus, oozed up. The needle was then passed in deeply at the lower fourth, and struck on what felt exactly like a stone or concretion. A cataract knife was passed down over needle which was withdrawn, but no stone was felt, although the needle had given the actual sensation of hitting a stone. A free incision was then made in the lower part of the organ, and the finger passed in, but nothing could be felt. A sound was then inserted which, however, did not pass down the ureter owing, probably, to the incision being in the lower third of the organ. The finger was then thrust into the hilum; all the calyces were explored, but no stone could be felt, with the finger inside and careful palpation outside. Several small nodules or lumps were felt. All these were needled. They were probably small cysts of the same nature as that seen on the surface. The operation had, therefore, unwillingly to be abandoned, although the operator could have sworn that a stone or concretion had been originally struck on.

One might note that while exploring with the finger inside, the respiration thrice stopped. The hæmorrhage in this case was very trifling.

A drainage tube having been inserted, the deeper structures were drawn together by catgut sutures, and the wound firmly closed by six silk sutures. Morphine gr. $\frac{1}{2}$ was injected after the operation as the kidney had been severely handled.

Subsequent progress.—The patient passed a restless night.

22nd March.—Patient uneasy and restless. The dressing, soaked with bloody serum, were changed. Temperature 102°, cough and viscid white expectoration, pointing to pneumonia.

March 23rd.—Temperature normal, pain much easier general condition satisfactory.

March 24th.—Doing well.

March 27th.—Urine still smoky. Sanguineous discharge from wound with uriferous smell. Cough still present with frothy expectoration. Respiratory sounds clear over both lungs.

April 3rd and 4th.—Rise of temperature at evening.

April 5th.—Dressing still soaked with uriferous discharge. Lower two-thirds of wound have healed, but there is no attempt at union in upper third, which is a fistulous track, four inches deep. Urine now quite clear. Erysipelatous blush around wound and interscapular region. Patient removed to a separate room, the ward in which he had been treated being rather over-crowded and occupied by some very foul cases—famine-stricken, sloughing ulcers and such cases.

To continue briefly the patient was brought to death's door by this and subsequent erysipelatous attacks, from which recovery was slow, and he was not discharged from hospital until June 3rd with the following note:—The wound has completely healed, the process of union being retarded by consecutive attacks of erysipelas. There has been no recurrence of pain in the loin ever since the operation, and the deep seated tenderness over the kidney is no longer complained of.

Remarks.—The operation only revealed cystic disease of the kidney. No stone was found, although the kidney was most freely handled and examined. It is just possible that a small stone was pushed on or slipped into the ureter, which was not carefully catheterised.

TEN YEARS' JOINT SURGERY IN THE KASHMIR MISSION HOSPITAL.

By ARTHUR NEVE, F.R.C.S.E.

THE modern hospital report contains names that would have been strange to our predecessors. They were working out the neat excisions by formal methods, which had replaced the previously inevitable recourse to amputation by the surgeons of still older date. And in the hands of many of them, conservative surgery became an art which saved lives as well as limbs, and attained all the success that was possible in pre-Listerian days. But it has been only the establishment of sound antiseptic surgery which has permitted the arthrotomies and arthrectomies which now contest with excisions the arena of limb conservation.

The general aim of the surgeon is to save life, to relieve pain, and to restore function. Thus in joint disease at an early stage he aims at complete cure, which should include movement. But when a tissue, such as the synovial membrane is deeply diseased, it may be necessary to remove it, and in many cases to be satisfied with ankylosis. Later on more radical measures may be called for, and even the sacrifice of a limb. But it is a relic of pre-antiseptic days to speak of excision as a substitute for amputation. Amputation should be a *dernier resort*, to remove a limb which is a hindrance to locomotion, or a source of constant pain, or to save life.

So long as the death-rate on excisions varied from 25 to 35 per cent., amputation might seem the safer proceeding. But now that the mortality has fallen to a figure under 4 per cent. in many hospitals, the relative position as regards safety is reversed. At the same time other less deforming measures than excision have now to be considered, which have a yet lower mortality. The Kashmir record is essentially one of conservative surgery; partly on account of Mohamedan prejudices, which may make the relatives of a Kashmiri patient more ready to sacrifice his life than a limb.

But a careful study of the work recorded during the past ten years shows that there is more to be said in favour of extreme conservatism in joint surgery than that it is a necessary concession to prejudice.

Reference to our operation tables shows that our classification refers to the operative measures employed.

In the early stages of disease, rest and counter-irritation, aspiration, or injection of iodoform

or Bier's treatment by venous congestion may be called for. But in hospital practice, in a but semi-civilised country, promptitude is needed. We have little chance of securing rest for an adequate period; and it is often best to operate early.

Arthrotomy heads our list with a total of ninety-seven cases. It is called for in acute or chronic suppurative arthritis of septic origin, whether traumatic, or dependent on some blood poison.

In the acute arthritis of infants, which is in this country often a sequel of small-pox, or a concomitant of general pyæmia, arthrotomy is indicated. As also in purulent arthritis secondary to acute epiphysitis. It may be desirable to irrigate the joint with an antiseptic fluid and to drain it. Or the whole joint cavity may be rubbed with iodoform gauze.

A very sharp distinction needs to be drawn between the operation performed under these conditions, or for a joint which is already discharging by septic sinuses; and in which free incisions and drainage may be but the preliminary treatment before resorting to amputation. Many of our cases belonged to the latter category, and thirteen out of ninety-seven were removed from hospital unimproved, some of them in order to avoid amputation.

Arthrectomy is indicated where disease has reached a destructive stage, or where the synovial membrane is infiltrated by tubercle. The Surgeon then operates with the view of extirpating every atom of local disease.

It is not good surgery to do formal resections of articulations leaving pouches of tubercular material in outlying parts of the synovial sac.

Neither is it scientific to remove the articular surfaces of bones, if the disease is confined to the synovial membrane. Antiseptic surgery permits of the discrimination of suitable cases for various procedures. It is true that the terms arthrectomy and 'excision' overlay, but the former serves a useful purpose in distinguishing the cases in which the articular surfaces of the bone are not sawn off. The principle is that the whole diseased tissue and that only shall be removed; the result aimed at is complete functional cure. Mobility is usually desired, and obtained, except in the knee, where possibly firm ankylosis should be encouraged. In the elbow, *per contra*, a maximum range of movement is required, and to obtain it free removal of bone may be necessary, and excision performed.

Our first systematic arthrectomy was performed in 1884. Between 1880 and 1890 the proportion of arthrectomies to excisions was fourteen to sixty-three; but in the past ten years it has been as thirty to seventy. During the last decade there have been twenty-one arthrotomies of the knee-joint, nineteen arthrectomies and only sixteen excisions.

The *Indications* for *Arthrectomy* are briefly as follows:—

(1) Tubercular disease of some weeks' duration with pain and increasing deformity, a pulpy swelling indicating the presence of diseased products other than synovial fluid.

(2) Cases in which with chronic tubercular disease the general health is suffering from the local irritation and absorption.

(3) Cases in which purulent synovitis suddenly succeeds epiphysitis.

(4) Traumatic cases, with external wound and septic infiltration of the synovial membrane.

(5) As a substitute for excision in young children, in whom even if there are small tubercular foci in the bones they can be cleaned out.

Excision may be performed in—

(1) some cases which have ankylosed in a bad position;

(2) for traumatic purulent arthritis, with injury of the bone;

(3) for tubercular disease of articular surfaces where patients have attained their full growth;

(4) where there are septic sinuses and bone disease, but no extensive peri-articular abscesses;

(5) where the patient is not over fifty years of age.

Amputation should be reserved for—

(1) patients so weakened by suppuration or constitutional disease that the risk to life from excision would be great;

(2) cases where the disease is too extensive for excision, owing to septic sinuses, peri-articular abscesses, or deep caries;

(3) where more than one large joint of a limb is seriously diseased, such as the knee and ankle;

(4) where the limb, if saved, would be not only useless but a hindrance;

(5) patients over fifty years of age with septic arthritis.

Rigid boundary lines can hardly be laid down. We have broken most of the above rules in the direction of greater conservatism. In some cases, more than one large joint has been excised or erased; in others extensive resection of long bones has been done with arthrotomy of a purulent joint.

Many very septic cases, with burrowing abscesses and extensive bone disease have recovered with useful limbs.

The *proportion* of *amputation* to conservative operations has been steadily decreasing. In the first decade it was as thirteen to eighty-two, *viz.*, one to six; in the last decade as twenty-eight to two hundred and one, *viz.*, one to seven.

Comparing this with the statistics of other hospitals the proportion is low. MacCormac states that at St. Thomas' Hospital, for the years 1876—1885 inclusive, there were three hundred and thirty-eight amputations for disease, and by a curious coincidence exactly the same number

of joint excisions, a proportion of one to one. At the Edinburgh Royal Infirmary, in the years 1894—1896 inclusive, there were one hundred and twenty-seven major amputations for joint disease against three hundred and fifty-two conservative operations, giving a proportion of one to three.

Perhaps the ratio of amputations in English hospitals ought to fall lower. Many surgeons are too ready to resort to amputation, for conservative surgery is far more difficult, and takes longer to accomplish its aim; but as MacCormac says of excision, "Whenever it may properly be chosen it is infinitely preferable to amputation, inasmuch as the limb is preserved, as are often also the functions of the joint."

The MORTALITY is worth a somewhat closer study. In the Kashmir Mission Hospital on 540 operations there were eight deaths. Half of these occurred after EXCISION. One was due to cholera during convalescence. Two infants died from chronic sepsis and exhaustion. The joints were septic and disorganized at the time of operation. One small boy died suddenly on the second day from syncope. There had been slight hæmorrhage after the operation, excision of the elbow, but not enough to account for the death.

A young woman died from phthisis after leaving hospital.

The mortality on ARTHRECTOMY was two in thirty; one of these died under chloroform; the case was published in the *Lancet* in 1898. This was the first fatal case under chloroform that had ever occurred in the Kashmir Mission Hospital. It happened at the end of a prolonged operation, just after the knee, long contracted, had been forcibly extended. So there may have been an element of shock. The other death was from chronic sepsis and exhaustion, in a case which might have been saved by timely amputation.

The mortality on ARTHROTOMY was two in ninety-seven. One of these patients was an elderly man with septic arthritis and peri-articular abscesses, following a neglected chisel wound of the knee-joint. He deliberately chose death rather than amputation. The other case died of debility due to chronic sepsis. Thirteen other arthrotomy or drainage cases left hospital unimproved, in some of whom we had wished to amputate the limb. Probably some of them died. Considering the very large proportion of neglected cases who have been starved and bled by native *hakims*, and who have septic sinuses at the time of admission, it is remarkable that the death-rate is not higher. Part may be attributable to the tough constitutions of Kashmir peasants, and part to the splendid position and open air conditions of the hospital. It is worth comparing the total mortality, eight out of two hundred and one major operations, on large joints, which gives a rate of 4 per cent., with the prevailing rate of 30 per

cent., or more at London Hospitals during pre-Listerian days. Had we been permitted to amputate more often, at least three or four cases might have been saved, and our death-rate reduced to 2 or 2½ per cent., which is the present rate at the Edinburgh Royal Infirmary. It may appear some slight set off against the higher mortality, that over thirty-two limbs have been saved which would have been amputated if our ratio of amputations to conservative operations had been the same as in Edinburgh.

Précis of operation on joints in the Kashmir Mission Hospital, 1890 to 1899, inclusive.

		Cured.	Improved.	Not Improved.	Left Hospital.	Died.
EXCISION of	Shoulder	3	...	...	...	...
	Elbow	26	1	1	1	1
	Wrist	4	1	...	...	...
	Hip	4	1	...	1	3
	Knee	13	2	...	...	1
	Ankle	5	3	...	...	...
	Smaller joints	4	...	...	...	...
	L. jaw, condyles of	6	...	...	...	...
ARITHRECTOMY of	Elbow	8	...	...	...	...
	Hip	1	...	...	...	...
	Knee	15	1	...	1	2
	Ankle	2	...	...	...	...
ARTHROTOMY of	Sterno-clavicular	1	...	...	...	...
	Shoulder	2	1	...	...	...
	Elbow	23	1	...	3	...
	Wrist	3	2	...	1	...
	Hip	19	3	3	1	...
	Knee	9	6	3	1	2
	Ankle	10	2	...	1	...
ASPIRATION or injections of larger joints		36	19	2	1	...
TENOTOMY, ETC., for Ankylosis of						
	L. jaw	11	3	...	...	...
	Shoulder	12	6	1	...	...
	Elbow	27	8	...	...	...
	Wrist	2	...	...	...	...
	Hip	17	8	1	...	...
	Knee	106	43	1	...	...
	Ankle	5	1	...	...	...
UNCLASSIFIED		12	4	1	...	...
Totals		392	116	13	11	8

About half the cases were under the care of Dr. E. F. Neve.

AN OPERATION FOR PILES.

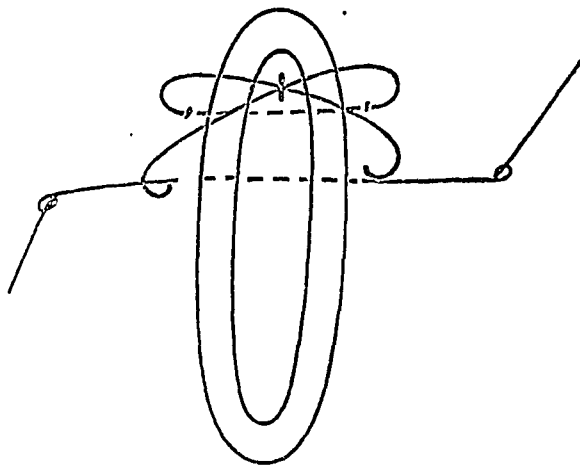
By W. H. HENDERSON, F.R.C.S.I.,

LIEUT.-COLONEL, I.M.S.,

Goculdas Tejpal Hospital, Bombay.

In the *British Medical Journal*, November 26th, 1898, Mr. Thelwall Thomas published an account of an operation for piles which I have tied and found so satisfactory that I have since been in the habit of performing it on

all my cases. The results are excellent, and it has the advantage of being easily and quickly performed. The patient complains of very little pain and recovery is rapid. A full description of the operation will be found in the *Journal* referred to above. I propose here to give a short description of the process. The patient having been prepared in the usual way for rectal operations, is placed at the edge of the table in the lithotomy position and the crutch applied. The rectum is dilated, and the pile with the redundant tissue having been brought into view is seized with a pair of forceps. The parts are then clamped, always in the long axis of the gut. Mr. Thomas, in a foot-note, recommends Doyen's broad ligament clamp (small size). This I have not tried. I use a small-sized hæmorrhoidal clamp which answers the purpose admirably. The pile is removed, leaving a good margin of tissue protruding from the surface of the clamp, which is now treated in the following manner:—A fine piece of catgut about a foot in length is taken, and threaded at each end with a domestic needle. One needle is passed through the edges of the wound at the upper part, until the middle of the catgut is reached, when a reef knot is tied. The needles are then passed to the opposite sides, re-entered and again tied as before. This is repeated until the entire length of the wound is closed. Mr. Thomas' simple illustration will help to make matters clear.



The clamp is removed when a wound with the edges in accurate opposition is left, which heals by first intention. All bleeding is effectively controlled. In none of my cases has a bleeding vessel ever given trouble. The tying of an artery is rarely called for.

No action of the bowels must be allowed for four days. On the fifth day a dose of liquorice powder is given. The introduction of an enema tube is to be avoided. It is claimed for this operation that the wound is treated on sound surgical principles. The use of the hot iron to the surface of a removed pile leaves on the separation of the eschar an ulcerating surface. The method of ligaturing piles and allowing the

ligature to ulcerate through, and the pile to drop off is one which would not for a moment find favour in ordinary surgical practice. Mr. Thomas' method is sound in principle, and the excellent results which follow it are, in my opinion, strong arguments in favour of its adoption. There are occasions when Whitehouse's operation may be necessary, but the operation which I have just described is an excellent substitute in a large majority of cases. An operation resembling Mr. Thomas' to some extent is described at page 673 of Treves' Surgery, Vol. II. Mr. Coates, of Salisbury, uses a special clamp with which he fixes the pile to be operated upon. Interrupted sutures are passed beneath the clamp, which is removed, the pile excised and the sutures tied. Mr. Coates remarks "that this substitutes for the contused wound produced by the ligature, a cleanly incised cut neatly adjusted by sutures."

Mr. Thomas, referring to the operations of the ligature of piles, cauterizing piles, injecting irritants and painting them with caustics, remarks "that they are contrary to the spirit of modern surgery. Who is there amongst us who would resort to such methods for the encouragement of healing or the control of hæmorrhage in other parts of the body?" Such operations are certainly rightly condemned, and might justly be relegated to the category of the tapping of ovarian cysts, and the indiscriminate cutting for stones.

A CASE OF FATAL SEPTIC GANGRENE: PRIMARY AND SECONDARY AMPUTATION.

By VICTOR E. H. LINDSAY,

CAPTAIN, I.M.S.,

1/4th Gurkhas, Bakloh.

THE patient, a rifleman of the 1/4th Gurkhas, was admitted to hospital on the 29th January 1900, complaining of severe pain in the right foot, with tenderness of the leg and thigh. A punctured wound, with a ring of discoloured skin, was situated in the middle of the sole, and from the opening a thick dark brown discharge escaped. The whole of the foot was swollen and congested, and the femoral glands were inflamed. The temperature on admission was 103.2°, the pulse was feeble and rapid (120 beats to the minute), and the man was sallow in appearance, with the anxious expression usual in cases of severe septicæmia. He gave a history of having trodden in bare feet upon a large thorn whilst cutting firewood on the hillside six days before admission. His age, according to his medical history sheet, was only 28, but he was probably nearer 38.

The presence of incipient double cataract suggested diabetes, but the urine remained absolutely free from sugar and albumen throughout his illness. As he steadily refused

amputation of the foot, treatment at first consisted of an attempt to remove the gangrenous tissue from the sole of the foot with free drainage and antiseptic applications every hour, but by the 2nd February (5th day after admission) the gangrene had reached the level of the internal malleolus, though tactile sensation remained unaffected in all the toes, and the dorsum of the foot was warm. The patient was at last persuaded that his only chance of recovery lay in immediate amputation, and with the assistance of Lt. Kemp, I.M.S., I removed the limb three inches below the knee on the 2nd February. The man's temperature at the time of the operation was 101.2, pulse 130. For the next two or three days all went well. The temperature remained almost normal, having previously been of an irregular remittent type. The pulse became stronger and the general appearance of the patient became more hopeful. But when dressing the stump on the 5th February I noticed that on the postero-internal surface of the limb the skin was of a bluish colour in the neighbourhood of the operation wound, and this appearance became more marked daily, while the temperature and pulse gradually resumed their previous warnings of constitutional danger. On the 8th (sixth day after the first operation) the condition became very grave. Pressure behind the stump below the knee gave the characteristic crackling of decomposition gases in the tissues, and a very offensive sanious discharge escaped through the internal drainage tube. The internal saphenous vein was prominent beneath the skin as a dark red line and the femoral glands were full of pus. The pulse was 144 and the temperature 102.5°, and although the patient was almost moribund, I decided to risk a further operation as a last chance, intending to excise the inflamed saphenous vein for several inches, together with the affected glands, after amputation through the middle of the thigh. The modified circular amputation was rapidly performed, the flaps adjusted over a long drainage tube protruding at either end of the stump, and dressings of boracic wool were applied.

The man's condition, however, was so grave that it was obviously useless to proceed further, and the pulse stopped twenty minutes afterwards, in spite of the injection of $\frac{1}{16}$ gr. strychnine and other stimulant measures.

Gangrene does not often occur in the reports of the Native Army Hospitals, and presumably this case would not have ended so disastrously had the man come to hospital before gangrene had set in, and had he not refused amputation till septic phlebitis had ensued. The onset of gangrene was possibly favoured by the exposure to cold at the time of the accident, the vitality of the man's foot being lowered by his standing in melting snow when he was collecting firewood.

THE
Indian Medical Gazette.

OCTOBER, 1900.

OUR ANKYLOSTOMA INQUIRY.

WE publish in other columns several articles on the ankylostoma and its ravages in various parts of India, and here propose to briefly review the series of reports which we have received in reply to our request for more information in our April issue. Lieutenant-Colonel R. Neil Campbell, I.M.S., sends us from England an article based on his researches some years ago when he was senior medical officer in the Andamans. This paper is of special value as Colonel Campbell went to the Andamans after a long experience of the ravages of the ankylostoma parasite in Assam. He divides the cases of anæmia which he met with among prisoners in the Penal Settlement into three kinds, (1) anæmia due to malaria, (2) anæmia due to ankylostomiasis, and (3) that due to the combined effects of both malaria and the parasite. He points out that the Andamans are much exposed to malaria, and the anæmia which is a prominent symptom of the malarial cachectic state is consequently very common. Ankylostomiasis is also very common among not only the prisoners but among the indigenous inhabitants of the Andaman and Nicobar Islands; the cases, he says, are even more than would appear from the hospital returns, as many cases are admitted for some other disease or symptom and appear as fever, debility, or diarrhœa.

Major H. Hudson, I.M.S., lately the Senior Medical Officer of the Penal Settlement at the Andamans, has sent us the following information about the prevalence of this parasite among the convicts and native inhabitants of the islands.

Dr. Gupta, the medical officer of the Northern District, writes that in ninety-seven cases examined he found the worm in every case; on the average the number of the worms was only nineteen. In another batch of sixty-eight cases the parasite was found in the stools of all after thymol, average thirteen; in forty of these there were next to no symptoms of anæmia, in twenty-two the anæmia was more marked, and in six it was profound. In nine indigenous Nicobarese the worm was found in all in considerable numbers (from sixty-four to five hundred and fifty-four);

in some of them the worm had apparently had little or no bad effect. On this point Colonel Campbell's observations are very interesting; he shows that the inhabitants of the Nicobars eat the flesh of pigs and of fish which are not properly cooked, hence their liability to worms of all sorts. All the Nicobar men and boys treated with one exception were slightly anæmic, and showed want of vigour; it was also noticeable that these men when attacked with any serious illness go very quickly to pieces, showing that the parasite has undermined their health, though they did not even know of its existence. Dr. Sanyal, of Wimberley Ganj, Port Blair, writes that out of fifty consecutive *post-mortems* on men who had died of various diseases, he found the parasite in only nine. The worms were only from ten to forty in number, but in two hundred and eighty-five patients in hospital for various disorders he found, on giving thymol, the worm in one hundred and sixty-four. These varied in number from under one hundred to six hundred and seventy-three, in one case. In this case the worm was considered a material complication of the case. The symptoms were continued fever, extreme prostration, coated anæmic tongue, with no special symptoms pointing to malaria; there was also a persistent severe gnawing pain in the stomach. After the first dose of thymol six hundred and seventy-one worms were passed, none after the second dose ten days later, and only ten after the third dose, at an interval of five weeks from the first dose.

The medical officer of the Southern District, Andamans, reports that he had found the parasite in twenty-eight cases out of thirty in healthy men, but in small numbers, also in one hundred *post-mortems* on persons dead of various diseases he had found the worm in seventy-six, but in no large numbers; other intestinal entozoa were also present, and in the duodenum and ileum were found ecchymoses which were considered to be due to the bites of the ankylostomes. In another series of cases the same officer reports finding the parasite in 92 per cent. of three hundred and thirty-nine cases. In one case the patient passed three hundred and one worms and had high fever, pain and tenderness in the abdomen, and was at times semi-comatose.

The above reports from the Andamans are interesting from many points of view. In the

first place they show that the ankylostoma parasite must be regarded as indigenous to the Andaman and the Nicobar Islands, for the Nicobarese, who had no opportunity of mixing with the Indian prisoners, were found to harbour the worm in large numbers; it is also shown that though the parasite exists in the Andamans yet it is certain that many of the convicts bring the parasite with them, from India, for it has been repeatedly found in prisoners from numerous districts in all parts of India on their arrival at Port Blair. It is worth noting that in the prisoners only a few cases were found to harbour the worms in any large quantity, whereas the indigenous natives of the Andamans and of the Nicobars were found to harbour them in much larger numbers. This would seem to point to the fact that while confined in prison, with no chance of reinfection, the numbers decreased, and only small numbers were found *post-mortem* or after special treatment with thymol. It is also apparent that men in apparently the best of health will be found to harbour this parasite; it is not till the number of parasites reaches at least one or two hundred that their host begins to show symptoms indicating their presence or any signs of loss of health. It is also probable, as Captain Fearnside points out in another column, that the worm does comparatively little harm till other diseases are also present, as dysentery or malaria; then it can be easily understood that the daily loss of blood from these bloodsuckers cannot fail to be harmful to the patient.

In the following report, for a copy of which we are indebted to Major E. Reilly, I.M.S., the Superintendent of the Central Jail at Akola, a quite novel and different view is taken of the effects of the parasite on the system. This is a report by Captain W. Glen Liston, I.M.S., on an investigation of certain cases in Akola Jail which were supposed to be scurvy (see *Indian Medical Gazette*, p. 267 above). Captain Liston divided the disease which he examined in Akola into four stages, (1) the stage of gradual onset; (2) the acute stage; (3) the chronic and relapsing stage; (4) the stage of gradual recovery. In his opinion the so-called scurvy or "spongy gums" are due to the absorption of toxins from the intestines, which toxins are secreted by the ankylostomes resident there. We publish this report in full, as it is interesting, not only from the ankylostoma point of view, but also because of the light it

throws on the question of scurvy, a matter which has often occupied our attention in these columns.

Lieutenant T. Hunter, I.M.S., reports that he has not been able to find any ankylostomes in any *post-mortem* which he has done in Buxa Duars, and Dr. U. C. Das of Birbhoom reports to the same effect as the result of his experiences in that station. Major J. K. Close, I.M.S., has found this parasite in three districts in the North-West Provinces, in Budaon District in 54 per cent. of *post-mortems*, in Bijnor in three out of seven *post-mortems*, and in Moradabad in eight out of eleven, or 72 per cent.; in thirty patients the ova of the parasite were found in seven cases, and in small numbers only. Only one of the thirty cases was at all anæmic.

In conclusion we consider that there is considerable evidence of a very widespread prevalence of this parasite in India, and if it was more often searched for it would be more often found. It is to be hoped that Colonel Hendley's scheme for providing microscopes in all Bengal dispensaries will soon come into force, and that advantage of them will be taken by the medical officers of our dispensaries; a systematic examination of the stools of patients would surprise even those who know that worm diseases are extremely common among those who attend the dispensaries of India. We have recently received a notice of a cheap microscope (price only £2 5s.) made by Mr. C. Baker, of 244, High Holborn, London, which has been specially devised for this very purpose of examining for intestinal parasites, and which can be strongly recommended for the purpose. In the above remarks we have not referred to the well-known work of Giles, Dobson, L. Rogers, R. Ross, or of the late Dr. H. Thornhill, as our columns during recent years have contained many discussions on their researches into the prevalence of this widespread parasite.

NOTE.—Major Giles, I.M.S., refers to the toxin theory in his article, *British Medical Journal*, p. 541, of September 1st. For the prevalence of the ankylostoma in Burma, see Dr. Oswald Baker's article *loc. cit.*, p. 546.

LONDON LETTER.

THE IPSWICH MEETING.

THE Annual Meeting of the British Medical Association, which took place at Ipswich on the 31st of July and the three succeeding days, was a decided success. The arrangements made for the accommodation, entertainment and recreation of the members attending the meeting were

admirable; the addresses were interesting, and the business transacted by the sections important. As this was the last meeting of the century, all the general addresses were retrospective. The President, Dr. Elliston, gave an excellent and scholarly view of the development and growth of the medical profession in England. Dr. Pye-Smith discoursed on medicine as a science and as an art, and showed how as science advanced, art became more enlightened and productive of benefit. Mr. Frederick Treves sketched the position and attainments of the surgeon in the nineteenth century, and had no difficulty in demonstrating that as his education and attainments improved, his position underwent a change for the better in the estimation of the community, and his capacity and power reached a higher level. Dr. Smyly selected maternal mortality after child-birth as his theme, and traced the influence of sanitation and aseptic precautions in the reduction or extinction of infective disease to which excessive maternal mortality has always been due.

MEDICAL POLITICS.

The general meetings were largely occupied by the discussion of matters concerning the organisation and constitution of the Association and the relation subsisting between the Council and the body of the members. There are three elements in the British Medical Association to which it is difficult to give equal and adequate representation and power. There are first the branches which have a regular organisation and are enabled thereby to take an active share in the life and business of the Association. These elect the members of Council which represent them in the general administration. Were all members of the Association also members of some branch the system of co-ordinated, separate and confined operation would be perfect; but a large proportion of the members are unattached to any branch and thus unrepresented on the Council. These constitute the second and a very substantial part of the associated body, and they can only give voice to their convictions and suggestions at the annual meetings, which constitute the third and by no means an inert factor in the corporate vitality. Now these meetings possess according to the rules of the Association a commanding power, and their vote on any question is final and binding; but the number of members attending the annual meetings is but a fraction of the whole,

and the number of persons present at any general meeting may be very limited. Thus snatch votes are not uncommon, and it seems absurd that the policy and action of an Association numbering some 19,000 members should be dictated by say 50 in annual meeting, perhaps packed for the purpose of carrying some particular point. The Council has to take these things into consideration and to determine how far resolutions carried in this manner are consonant with the general or predominant feeling. This is perhaps done by referring the matter to the branches. Thus arise an antagonism and bitterness between the Council and some sections or individuals, and this spirit of jealousy and opposition found somewhat lively expression at the Ipswich meeting. On the motion of Mr. Victor Horsley, who takes a prominent place and interest in questions of medical politics, a resolution was unanimously adopted "that a Committee be appointed to consider and report upon the best means of reorganising the British Medical Association." Twenty-four members were elected to serve on this Committee, twelve of whom were nominated by the Council and twelve by Mr. Horsley. This Committee is to prepare a professional report which will be referred to the branches for consideration. The outcome of these proceedings will be laid before the next annual meeting. By this means it is hoped to devise some means of better representation and more harmonious and effective co-operation between the members of the Council.

AN INDIAN GRIEVANCE.

In these words is signified the annually recurrent motion regarding the hardship sustained by indigenous graduates in being debarred from obtaining Government appointments in medical colleges without undergoing the ordeal of entering the Indian Medical Service. This year the inevitable resolution was proposed by Dr. S. K. Mullick in peculiarly inaccurate and offensive terms. It asserted that grade rank in a military service and not ability was the ground of selection, and that men were "pitch-forked" from one chair to another, and that these practices were a "sinister bar" to the advancement of medical science in India. Therefore a sub-committee of the British Medical Association must be appointed to consider and report what steps ought to be taken to put an end to the scandal. The proposal was in fact to subject the administration of the Govern-

ment of India and the work of the Indian Medical Service to the judgment of a small irresponsible body which under the circumstances must depend for its facts upon loose and probable interested information supplied and collected at a distance from the institutions and persons concerned. Making bricks without straw was a trifle to the onus proposed to be cast on this unfortunate sub-committee. The matter was practically shelved by referring it to a section of the Parliamentary Bills Committee which takes into consideration Indian and Colonial subjects. Those who so persistently clamour for an "open door" to the best and most coveted appointments in the Indian Medical Service would do well to postpone their agitation until they have displayed capacity to fill them which they have assuredly not as yet done. The private medical schools which have been started in India, and which constitute the legitimate means of gratifying and utilizing such aspirations, have not as yet evidenced any conspicuous success in teaching or research, and the high sounding aims, such as sanitation and science, of which the agitation profess to be votaries, have not hitherto gained much from their work. On the other hand, the initiation, development and maintenance of medical education in India have been entirely due to the enthusiasm, ability and industry of officers of the Indian Medical Service, and no case or suspicion of failure or incapacity has ever been made known. As long as the Government of India can get the work in its medical colleges as well done as it has been by its own servants, it will not seek for professors and teachers elsewhere, and it should not.

THE TROPICAL DISEASES SECTION.

The proceedings of this section were exceedingly interesting, and both discussions and papers were without exception instructive. Several new facts were published, and welcome light thrown on scientific and practical points relating to tropical maladies. Captain James's observations regarding the development of *filaria nocturna* in the anopheles were novel, and Dr. Williamson read a valuable communication indicating the agency of an insect—the sphalangid—in communicating anthrax in Cyprus. The discussion on quinine turned mostly on its prophylactic value. This was affirmed by most of the speakers; but it was pointed out that the prophylac-

tic exhibition of quinine could not prevent infection, though the drug was competent to destroy the plasmodium after infection had taken place. The use of the microscope in guiding and checking the employment of quinine was strongly urged.

The discussion on anchylostomiasis elicited many valuable contributions by Giles, Rogers, Fearnside and others. The evil effects of the parasite were shown to depend largely on numbers and on the condition of the host. Mr. Jonathan Hutchinson introduced the discussion on yaws, which he held to be syphilis modified by climatic and other circumstances. This view was ingeniously maintained and illustrated by cases and photographs, but it did not commend itself to those members present who had bestowed thought and study on the subject. A full report of the transactions of the section will in due time appear in the *British Medical Journal*. *

6th August 1900.

K.McL.

Current Topics.

MOSQUITOES AND MALARIA IN CALCUTTA.

WE have already promised to give some account of Dr. Neild Cook's investigations into the connection between the presence of the anopheles mosquitoes and malaria in the city of Calcutta. The Corporation sanctioned a total expenditure of "not more than 30 rupees a month," a magnificent sum truly for the Capital of the Indian Empire, for the investigation of a disease which causes more mortality than all other diseases put together. However, the sum small as it was, was well spent in the employment of Mahomed Bux and an assistant, the former being somewhat of an expert in this line, having been employed by Major Ross during his special malaria work in Calcutta.

The present report only deals with three months of mosquito hunting, and in that time there have been discovered 89 tanks in Calcutta in which the anopheles larvæ were found in abundance. It is more than possible that many more breeding places will be found during and after the annual rains.

Dr. Cook remarks that the most of the places in which the mosquitoes have been found are tanks, i.e., large collections of water, not merely roadside puddles. The large tanks used for drinking water, or those containing compara-

* *British Medical Journal*, 1st Sept. 1900.—(Ed., I.M.G.)

tively clean water, were not found infested with the larvæ, but rather those well-known smaller tanks covered with a green scum, only too well known to every resident of Eastern Bengal. Dr. Cook indeed rightly compares them to the dirty duckponds of an English village. Many of these anopheles tanks contained fish and tadpoles, but as a rule where fish were plentiful the anopheles were not so numerous. The anopheles were not found in the very filthy tanks containing practically sewage nor in drains containing sewage, which, however, formed breeding grounds for some varieties of the culex. Anopheles were also found in stagnant ditches, which contained waste water from the overflow of standpipes.* Excavations in the ground contained large numbers of larvæ. Towards the east of the Circular Road, which always had the repute of being a most feverish place, a large number of anopheles tanks were found. So far Dr. Cook has not succeeded in finding any anopheles larvæ in any of the numerous paddy-fields he has examined, though our readers will remember that Captain S. P. James, I.M.S., of Quilon, has often found them in these situations. Nor has Dr. Cook obtained the anopheles from any wells, though he admits he examined only a few. It is also worth noting that in many places the anopheles larvæ were found with the aid of a tin dipper and a porcelain dish where they were invisible to the naked eye.

Some experiments were made in the extermination of the larvæ with kerosine, but it was found that though the larvæ could be quickly killed by kerosine in pools, unfortunately they re-appeared again in about a week. It is also pointed out that it is not an easy matter to cover even the surface of a small tank with kerosine, especially when it contains much vegetation, and the experiments in this direction were by no means a success. Another important point is noted that the mosquitoes do not generally travel far from their breeding place, but "sit tight under shelter when the wind is strong," so that if they were once exterminated within the town, it is doubtful if they would find their way in again, from the east side of the canal where they are very numerous.

Dr. Cook concludes as follows:—"All things considered it does not appear probable that any appreciable effect can be made on the prevalence of malarial fevers in Calcutta with an expenditure of 30 rupees a month, including pay of establishment, though that has been found sufficient for a preliminary investigation into the prevalence of anopheles." What we have always advocated is that this experiment be thoroughly tried on a much smaller scale, as in jails, asylums or similar institutions, and, if successful, attempts on a larger scale might then be made.

THE NEW EDITION OF MANSON'S TROPICAL DISEASES.

EVERY one who knows the first edition of Dr. Manson's most excellent "Manual of Tropical Diseases" will not be surprised that within two years of its publication a second edition was demanded, in addition to three reprints of the first edition. Advantage was therefore taken by Dr. Manson to bring his book up to date, and to incorporate much of the work which has been done of recent years in the domain of diseases of the tropics. When we look back on the past dozen years few will fail to be struck with the great progress which has been made in the study of tropical diseases, which indeed dates from, and in India may be partly due to, the holding of the Indian Medical Congress in Calcutta in 1894. Of this progress Dr. Manson's book is in itself evidence.

Those who have kept themselves acquainted with current work on tropical medicine will guess for themselves in what directions Dr. Manson had to alter or add to his book to bring it into line with modern research. In the first chapter they will find the subject of malaria treated in an even more complete manner than in the earlier edition. A full description of the metamorphosis of the malarial parasite in the mosquito will be found, as well as a short account of some of the zoological affinities of the parasite. We note that the chapter on hæmoglobinuric fever is still included in the chapter on malaria. We think, however, that he makes too much of the discovery of a few cases of fever in India in which the symptom of hæmoglobinuria has been found as a complication. There is no doubt of the (rare) occurrence of such cases, but we maintain that malarial fever with the complication of hæmoglobinuria is not the same thing as the existence of the deadly blackwater fever of Africa. Nor is it at all likely that such a prominent symptom as the black urine would have been overlooked in the cases which a generation ago in India were often called "bilious remittents." So far cases of so called "blackwater fever" in India have been reported from the more intensely malarious parts of India, and often among Europeans in those parts. One thing is quite certain is that this symptom is by no means at all common as a complication of the ordinary malarial fevers of the plains of India.

We are glad to see that in the chapter on plague credit is given to Major Childe, I.M.S., for having been the first to call attention to the pneumonic form. The chapter on Malta fever is also up to date, and gives the recent researches at Netley into the serum sedimentation test. The chapter on tropical typhoid and that on so-called typhomalaria are also amplified. The chapter on dysentery has few alternations, the largest is one on an anomalous form of dysentery

* See. [Sany. Commr., N.-W. P., Report for 1899, p. 32.—Ed., I.M.G.]

described by Daniels. We note, however, that Dr. Manson has not neglected the hint given in our review of the first edition of the value of a preliminary dose of castor oil and laudanum. The chapter on liver abscess contains little that is new, beyond an allusion to the paper by Major Marshall, I.M.S., on the amoeba. There will be found many interesting additions to the chapter on filariasis.

On the whole, we were always of opinion that the first edition was a good one, and now we can say that the second one is still better, and we can confidently recommend those who have not got the book to get it at once.

THE BRITISH MEDICAL ASSOCIATION AT IPSWICH.

SOME months ago in calling attention to the programme for the tropical section of the British Medical Association meeting at Ipswich, we strongly commended it to the attention of the profession in this country. We pointed out that the President of the Section (Kenneth McLeod) and the Vice-Presidents, Oswald Baker, Andrew Duncan and Ronald Ross, were distinguished members of the Indian Medical Service, and that it behoved medical men in India to do all that they could to support the section and make it a success.

From the accounts which have been published, and from a description kindly sent us by Major F. P. Maynard, I.M.S., who was present, it is clear that the tropical section was a distinct success, and compared extremely favourably with the meetings of the two former years.

We note that the following medical officers attended and took part in the discussions or communicated papers:—Colonel Kenneth McLeod, Dr. Andrew Duncan, F.R.C.S., I.M.S. (retired); Dr. Oswald Baker, I.M.S. (retired); Major Ronald Ross, I.M.S. (retired); Lt.-Col. J. Maitland, I.M.S.; Lt.-Col. Marsden, I.M.S.; Major G. M. Giles, I.M.S.; Major F. P. Maynard, I.M.S.; Major W. J. Buchanan, I.M.S.; Captain L. Rogers, I.M.S.; Captain C. J. Fearnside, I.M.S.; and Captain S. P. James, I.M.S.

Colonel Kenneth McLeod's address on the scope and aim of the section's work was extremely interesting, and pointed out the large amount of work which was still to be done, before we knew enough to control enteric fever, plague or dysentery. He pointed out that the section was concerned with three classes of disease:—(1) the essentially tropical, *e.g.*, kala-azar or beriberi; (2) those originally tropical which may be disseminated outside the tropics by trade and human intercourse, *e.g.*, plague and cholera; (3) those diseases not specially tropical, but which are liable to be aggravated in prevalence or in severity by tropical conditions, *e.g.*, enteric fever.

After this address Dr. Andrew Duncan read a paper on a favourite subject of his, *viz.*, the Action and Modes of employment of Quinine in

malaria. In spite of its title the paper appears to have dealt chiefly with the so-called "prophylactic" issue of quinine, and Dr. Duncan stated that his experience was in favour of this method of combatting malaria. Major W. J. Buchanan's paper on the prophylactic issue of quinine was then read. It consisted of a résumé of his personal experiences of the issue of Quinine as a prophylactic on a large scale in Indian jails, and synthesised the several papers written by Major Green, Major Maynard, Lieutenant-Colonel French Mullen, Captain Fearnside and Dr. R. Ashe, which appeared in our columns during the past year. It was remarkable that there was a general consensus of opinion in favour of thus issuing quinine, but few were able to give more than pious opinions in its favour. As Colonel McLeod pointed out we want the subject investigated in its relation to the parasite. Dr. Manson made a useful remark when he pointed out (as Major Maynard did in our columns in March last) that the prophylactic use of quinine is only a phase of its therapeutic action, it was an application of the drug to the parasite, it is in no way immunised the body against the entrance of the parasite. Major R. Ross recalled the fact that chronic malarials suffer from secondary or toxic fever, and that in such cases quinine has no specific action. No one seems to have noted that the so-called prophylactic issue of quinine has been tried on two quite different bodies of men, and that the results need not be the same, *e.g.*, it is not the same thing to experiment upon a body of soldiers or prisoners in a malarial country—men who have frequently suffered from malarial fever—and a body of troops from a non-malarial country—say an expedition from England to the West Coast of Africa. It is possible to conceive that quinine might have a much more certain 'prophylactic' effect on those who never were exposed to malaria before.

The subject of filariasis brought out two papers, one by Captain S. P. James, I.M.S., on the metamorphosis of *filaria nocturna* in the anopheles, which we have already published in our columns (September 1900); and another by Lieutenant-Colonel J. Maitland, I.M.S., who maintained that the discovery of the filarial worm in the proboscis of the mosquito was not conclusive proof that the old idea of infection by water was wrong. Indeed, on the mosquito bite theory, it is difficult to understand how Europeans escape to the great extent they do when they live in filaria-infested countries like Cochin, Fiji or the West Indian islands.

The next paper read was one by Major W. J. Buchanan, I.M.S., on "Hot Weather Diarrhoea in India," or that severe form of watery flux common in the hot weather, especially in India.

Dr. Duncan then read a paper on the diseases of Goorkhas, in which he referred to a "peculiar form of malarial fever common among them, which was resistant to quinine." Till the full

text of this paper is published it is impossible to criticise it.

It is curious how two of the three subjects proposed at this section have been anticipated by discussions in our columns. We have just referred to the question of quinine, and the next subject is ankylostomiasis, about which we started a special inquiry several months ago, the results of which we give in this issue. The discussion at Ipswich was introduced in a paper communicated by Major G. Giles, I.M.S., which was based upon his well-known researches in Assam in 1890. Major Giles' views on the harmfulness of this parasite when it complicates other diseases are well-known and need not be repeated here. Captain Fearnside communicated the paper, which he wrote for our collective inquiry, and which we publish in this issue. Captain Leonard Rogers sent a paper on the Differential Diagnosis of Ankylostomiasis, with special reference to the type of the anæmia—a subject which has already been discussed in our columns. Both Dr. Oswald Baker and Dr. Manson agreed that infection was by food rather than by water. The discussion (as reported) seemed to avoid the crux of the whole question, viz., the harmfulness or the reverse of the parasite. This is the point which has always agitated medical opinion in India and Ceylon as our columns for the past five years testify.

Mr. James Cantlie read an interesting paper on sub-hepatic abscess, which may be taken as a supplement to his paper on suprah hepatic abscess, read last year. There can be no doubt that these papers of Mr. Cantlie are founded on accurate observation. Recently it was part of our duty to read through the *post-mortem* reports on a large number of cases of liver abscess among European soldiers in India, and we met there two or three cases in which the *post-mortem* description of the abscess exactly corresponded to that of Mr. Cantlie. The abscess was not in the liver but in one case above, between it and the diaphragm, and in another case below and internal to the liver. The diagnosis of such abscesses from the intrahepatic or ordinary abscess must be extremely different, but Mr. Cantlie has done service in calling attention to the fact of their existence.

Both Dr. Manson and Colonel Kenneth McLeod agreed that surgeons in England were unnecessarily heroic in their operations for liver abscess. Manson had seldom found any necessity for the removal of ribs, nor for elaborate stitching of parts together. He preferred the use of the trocar and canula—[as described in his Manual, new Edition, p. 404, &c.] Dr. Manson has never met any alarming hæmorrhage from aspirating a liver in search of an abscess, as has been described in our columns by Lieutenant-Colonel Hatch, I.M.S. (*Indian Medical Gazette* for 1898, April, p. 137).

Dr. Williamson of Cyprus, communicated an interesting paper on the "Cyprus Sphalangi," a sort of ant, whose body was covered with fine hairs, which are said to carry the spores of anthrax and thus convey the infection.

Major R. Ross read a paper advocating improvement of sanitary and medical practice in the tropics. These suggestions included proper instruction in tropical diseases, the supply of microscopes and antitoxins for the proper diagnosis of diseases, medical libraries, and the foundation of research laboratories.

The discussion on yaws was interesting; being introduced by Mr. Jonathan Hutchinson, it is needless to say that the hearers were treated to a very skilful piece of special pleading in favour of the view that yaws was only syphilis modified by race and climate—a view which Mr. Hutchinson recently elaborated most skilfully in the '*Polyclinic*.' Few medical men know syphilis as well as Mr. Hutchinson does, but all know it fairly well, and it is remarkable that none of the speakers with tropical experience agreed with him, they all maintained its absolute distinction from syphilis. It is curious that the patient who was shown to the section as "Yaws" was agreed upon by all present to be a case of "syphilis."

EPIDEMIC DIARRHŒA IN ENGLAND.

THE subject of epidemic diarrhœa is always one of interest and anxiety to the medical officer of health in England. We lately pointed out one theory which referred the infection to horse dung, scattered on the streets of towns. We have since received an excellent pamphlet on epidemic diarrhœa by Dr. A. Newsholme, the well-known Statistician and Health Officer of Brighton. In this he shows that the offending microbe has not yet been isolated, but he says it may be the *bacillus enteritidis sporogenes* of Klein—an organism which, as we have months ago shown has been made to do duty as a cause of the celebrated mild "rice pudding" epidemic at St. Bartholemew's, and as a cause of asylum colitis, which term by the way we are glad to see Dr. Manson denouncing in his new edition, he agreeing with us that it is nothing more or less than asylum dysentery. This, however, is by the way. Dr. Newsholme points out that epidemic diarrhœa is chiefly a disease of urban life, and is associated with the increase of urban populations of recent years. The disease is one which chiefly attacks the families of the poorer classes, and it is shown that towns with a water-carriage system of sewerage have, as a rule, much less diarrhœa than those retaining other methods of removal of excrement.

The essential point in prevention is not to allow organic débris to accumulate or dust to be scattered about.

The germ of the disease is said to be carried in the dust, and thus can infect milk and other articles of food. The milk which is usually blamed is according to Dr. Newsholme only the vehicle of the germ, just as mosquitos and rats are the vehicles of malarial and plague germs.

The curious fact is that in England it is a disease which chiefly affects children.

COMPARATIVE PROVINCIAL MEDICAL STATISTICS.

THE following table gives a few important comparative statistics as to the attendances at hospitals and the chief surgical diseases in certain provinces in India. They are extracted from the Annual Reports for 1899:—

Province.	Total No. of Patients.	No. of Hospitals.	No. of Surgical Operations.	No. of Cataracts.	No. of Ovariectomies.	Lithotomies.	Suprapubics.	Litholapaxies.
N.-W. P. & O.	3,999,665	374	180,190	5,648	15	367	64	438
Punjab ...	3,154,277	272	170,051	5,321	14	247	6	1844
Bengal ...	2,879,845	513	137,123	2,682	9	160	1	102
Calcutta ...	243,448	15	25,109	390	16	4	..	7
Madras City	211,929	14	15,603	1,063	18	7	...	1
Madras ...	4,266,308	...	121,261	228	4	28	...	3
Bombay ...	Not yet received.	...	...	...	...	...	...	...

THE NAVY AND ARMY SECTION AT THE B. M. A.

APPARENTLY this new section was considered to be a success, but we have not been impressed by the discussions, which were vague and not very practical. The section, however, was fashionable and many ladies attended it. In the absence of the majority of R. A. M. C. in South Africa, the discussion was chiefly in the hands of Volunteer and retired medical officers. The ladies were even invited to join in the discussion, but we have not seen any of their remarks in print.

THE DISCUSSION ON STONE OPERATIONS AT THE B. M. A.

THERE was an animated discussion on a paper by Mr. P. J. Freyer on the best methods of dealing with large stones in the bladder, in which Mr. Burton, of Norwich, Dr. D. F. Keegan (I.M.S., retd.), Mr. Cadge and Mr. Reginald Harrison took part. Messrs. Freyer, Keegan and Harrison were in favour of one or other form of perineal lithotomy, while Mr. Cadge, Mr. Burton, Professor Nicolaysen (of Norway) were in favour of the suprapubic operation. The question of the hardness of Indian calculi came up, and Mr. Cadge with his experience (more than that of most sur-

geons in England) was in favour of the suprapubic operation, especially said Mr. Cadge "in the hands of the average surgeon." Quite so, in the hands of the non-expert the abdominal operation is possibly preferable, but the question is has a surgeon of lesser experience the right to do this operation, with its admittedly high death-rate, rather than hand it over to the specialist who can do the better operation. It is a remarkable tribute to Indian surgery that it was assumed as a matter of course that for ordinary cases of moderate sized stones litholapaxy was the correct operation. This is something for Indian surgeons to have established in face of much opposition.

It is a pity our special stone number was not out in time to be in the hands of the surgeons taking part in this discussion. It has for ever established the superiority of Indian methods.

ASYLUM POLYNEURITIS.

IN the section of Psychology at the British Medical Association Meeting there was a discussion on what was called "Peripheral Neuritis in Insanity," or Psychosis polyneuritica as certain continental writers call it. It is said to be a characteristic mental alienation secondary to a toxæmia resulting from alcohol, or metallic or septic poisoning. The symptoms of neuritis were very distinct, including tenderness in muscles and nerve trunks, areas of anæsthesia, analgesia and paralysis.

It must be very difficult to distinguish between such a disease—if it is a separate entity—and cases of polyneuritis or asylum beri-beri, which have been so often reported in English and American Asylums. The report of the discussion does not however mention beri-beri.

A SEWAGE DISPOSAL EXPERIMENT IN CALCUTTA.

MR. A. E. SILK, the Sanitary Engineer, Bengal, has published an interesting pamphlet on the experiments which he has been conducting for over a year in the Presidency Jail, Calcutta, on the most recent methods of sewage disposal—one of the most important of all the numerous sanitary questions in India.

One of the objects of the experiment was to ascertain whether it would be possible to carry out the satisfactory disposal of sewage in the crowded quarters of a town, and thus avoid the nuisance and expense of its carriage to trenching grounds. Such sewage would naturally consist of a large quantity of "fresh" sewage from the public latrine and a mass of "septic" sewage from neighbouring public latrines.

It is not necessary for us here to enter into a description of the now well-known tanks for the biological disposal of sewage. It is sufficient to say that it has been proved possible to erect and work such a septic tank in close proximity to a

public thoroughfare without creating the slightest nuisance, and it can be worked by ordinary native labour without any special supervision. The fact that the filtrate from the tank and filters was allowed to pass into an open tank in the jail garden, and that it gave rise to not the slightest smell or nuisance is proof of the efficacy of the methods employed. Mr. Silk concludes his pamphlet in the following words:—

"The author is of opinion that the septic tank system is undoubtedly a satisfactory method of disposing of sewage when a small supply of water of about half a gallon per head is available, and that probably it will be found equally satisfactory when the quantity of water per head is even less. The experience of the septic tank system of disposal in the Presidency Jail has shown that the necessary structures may be placed in close proximity to crowded thoroughfares without causing any nuisance or offence and that the system can be worked by native agency."

ADDITIONAL NOTES ON STONE.

WE received several interesting notes on stone too late to be incorporated in our special number;—to these we must briefly refer to here. Capt. Cochrane, I.M.S., writes from Puri that he operated on an eleven ounce stone in Sialkote recently. Capt. A. J. Macnab, I.M.S., tells us that at Mardan all the stone cases come from across the border, from Bonar, Swat, Bajaur, and the Mohmand country, even some from Kohistan and the Kunar Valley. Capt. Macnab was probably the first to do litholapaxy in the Kunar Valley, when up there with the Asmar Boundary Commission in 1894-95.

Even these Frontier men insist upon the "operation without cutting," such is the repute of Bigelow's operation in the hands of the surgeon in India. By-the-by Captain Macnab refers to five cases of renal or ureteral stone successfully treated by piperazin (gr. v t. i. d.). The rarity of stone in Burma is shown by the following figures kindly supplied by Capt. C. Barry, I.M.S., of Rangoon. There are only on the average eight cases a year in the General Hospital, Rangoon, and in the past five years there have been in the whole Province of Burma only one hundred and five lithotomies and thirty-four litholapaxies.

WE drew attention last month to the absurdity of Koch's views on malarial immunity. Since then we find that Laveran at the International Medical Congress has also opposed these views (*Résumés des Rapports, section de Bacteriol.*) Laveran writes. "Le professeur Koch a fait en Afrique et à Java des observations favorables à l'existence d'une immunité acquise chez les indigènes des contrées palustres; cette immunité serait la conséquence d'une atteinte de

paludisme dans le jeune âge. Des faits nombreux montrent que les indigènes des contrées palustres tombent les plus souvent dans un état de cachexie qui exclut à vrai dire les manifestations aiguës du paludisme, *mais qui ne mérite pas le nom d'immunité*. Les tentatives faites pour obtenir l'immunité artificielle contre le paludisme ont échoué jusqu'ici."

If Professor Koch is content to call "immunity" the fact that chronic malarials suffer not from acute attacks of intermittent fever, but from attacks of low or irregular "secondary" (Ross) or toxic fever he will strangely pervert the ordinary meaning of the word. It is these cases which Koch calls "immune" who die in their thousands from malaria.

THE Director-General, Indian Medical Service, has announced that in consequence of the strain on the Indian Medical Service owing to demands for China and the continuous presence of famine and plague the annual dinner at Simla will not take place this year, since few or no officers would be able to obtain leave.

COLONEL J. DUKE, I.M.S., in his article in this issue raises an interesting question, as also did Lt.-Col. Hatch in our September number, *viz.*, the comparative rarity of cases of renal stone. Most stones in the bladder come from the kidneys, nevertheless it is comparatively rarely that cases of renal or ureteral calculus are reported from Indian Hospitals. We invite the opinion of our readers on this point.

A CURIOUS form of sudden and fatal fever has been somewhat prevalent of late in the Monghyr District—it is called by the natives '*urhai fever*' because it is usually fatal in about two and half days. Some say it is plague, others that it is cerebro-spinal fever.

THE recent furious attack on the hospitals in South Africa by a certain society lady shows pretty clearly that the hospital arrangements out there have been viewed with no friendly eyes by what the papers call "Society"—*Spretæque injuria formæ*,—Society has had its revenge on Mr. Treves' speech on the plague of fashionable women.

THE account quoted by Capt. L. Rogers, I.M.S., in our Current Literature column of the strange form of fever in North China is very interesting and deserves further study.

THE *British Medical Journal* states that an inquiry has been started in India to find out if there is any connection between the dust in jute

mills and cases of tetanus—a very common disease in Calcutta.

WE have received an admirable circular drawn up by Dr. A. Mitra, L.R.C.P.E., the Chief Medical Officer, Kashmir, on the precautions which should be taken in the event of an outbreak of cholera. The advice given is sound, and the rules laid down for the management of cases of cholera in hospital or a private house are judicious and practical.

It was refreshing (writes a correspondent) to hear at the British Medical Association Meeting Dr. Manson congratulate Dr. Flexner (of Baltimore) on his having given up the amoeba as a cause of tropical dysentery. We have always written against the amoeba, but few at home had the courage to oppose the views so plausibly urged by Lafleur. Anyone who has read American articles on dysentery in the Cuban War is aware to what lengths the amoebic causation was pushed. Now Dr. Flexner, as the result of the Medical Commission to the Philippines, denies that the amoeba is of any importance.

ANOTHER portion of the Report of the Indian Plague Commission is published in the *Gazette of India* (July 21st). We propose to deal with it in another issue. It is well worth reading, though it practically amounts to an admission that very little can be done to prevent plague once it has got a start. Every method that Hygiene demands for the suppression of the disease is found more or less impracticable to thoroughly carry out, and without thoroughness there will never be any great success. The opposition of the people must ever be reckoned with. The notes of dissent by Dr. Wright and Dr. Ruffer, and another by Prof. Fraser are very interesting.

It is not easy to be sure that *Kala-azar* is disappearing from Assam, however, if we take the combined figures for *Kala-azar*, and 'fever' it is clear from Colonel Carr-Calthrop's report that there is a substantial decrease. By-the-by we would like to hear more of the disease or collection of symptoms which in Sylhet goes by the vernacular name of *petmota* or *mulkipira*. It looks very like malaria cachexia of a bad type, and after all *Kala-azar* is said by Rogers and Ross to be malarial cachexia. Col. Carr-Calthrop, I.M.S., thinks it is *Kala-azar*. If the Royal College of Physicians had known a little more about the sequelæ of malaria they would not have abolished the term 'malarial cachexia' from their "Nomenclature of Disease."

WE wonder who suggested the Commission on the "connection, if any, between Dysentery and Enteric Fever" in the Army in South Africa. The Commissioners are Dr. W. J. Simpson,

Prof. Lane Notter of Netley, and Major D. Bruce, R.A.M.C., F.R.S.

The causation of dysentery on field service is a very important subject; but we do not see how any connection between it and enteric fever is likely to be discovered.

A REASONABLE article on the "Sick and Wounded in War," by Surgeon-Colonel F. H. Welsh, A.M.S., appears in the *Fortnightly Review* for September 1900.

Reviews.

A Manual of Medicine.—By W. H. ALLCHIN. Vol. I, General Diseases. London: MACMILLAN & Co., 1900.

THIS is an admirable instalment of a series of five volumes which will make up the "Manual of Medicine" under the general editorship of Dr. Allchin, of Westminster Hospital. This manual is in fact a sort of miniature Allbutt's System, each article being written by specialists. We have already reviewed in these columns other volumes of the same series being brought out by Messrs. Macmillan, viz., Stonham's Manual of Surgery, and Dr. Smith's Outlines of Diagnosis.

The present volume deals with the infective fevers, and diseases due to atmospheric influences. The chapters on Diseases of the Tropics have been placed in the competent hands of Mr. James Cantlie, and, on the whole, are very satisfactorily done. It is curious, however, how mistakes are perpetuated from book to book, e.g., in the chapter on Dysentery (which is particularly good and shows evidence of a study of recent literature), we find it noted that while the death-rate for Natives is from 30 to 40 per cent., that of Europeans is from 3 to 22 per cent. These figures were copied from Davidson's book, and are far from accurately representing the facts. We have elsewhere shown that such high death-rates represents only dysentery which has been neglected by the sufferers till the affection has become chronic or proceeded to the ulcerative state, for promptly-treated dysentery the death-rate neither in Europeans nor Natives should be over 7 per cent., which also is the figure given by Sheube for dysentery in the Far East.

The chapter on Malaria is of course up-to-date and satisfactory. Of the non-tropical diseases the best chapters are on Typhoid Fever, Influenza and Small-pox. Dr. Still has also an excellent chapter on Infective Meningitis, and this is the first book of the many we have seen on this disease, which recognises the fact of the existence in India. On the whole, the volume is excellent, and the series promises to be an admirable manual for the senior student or for the practitioner.

Official Year-book of the Scientific Societies.—London: C. GRIFFIN & Co., 1900.

THIS admirable year-book is so well known that it needs but little introduction to our readers. It is now in its seventeenth year of issue. All official changes in the committees of every society in Britain are noted, and a list of papers published or read at the various societies is also given. In every way the yearly volume forms an invaluable index to the scientific literature of each year.

The Pocket Formulary for Diseases of Children.—By LUDWIG FREYBERGER, of the Great Ormond Hospital for Sick Children. London: REBMAN, LD., 1900. Price, 7s. 6d.

THIS is the second and revised enlarged edition of this elegant little volume. The object of the book is to give the busy practitioners in a concise and handy form all information which is required as regards the treatment of diseases of children by drugs. Those drugs of which the writer has formed a favourable opinion are noted as useful or very useful. The decimal system of doses as well as the more clumsy English system are both given. Special care has been taken to give palatable prescriptions, a very important point in prescribing for children. The amount of the flavouring agent which suffices to hide a disagreeable taste has been fixed in each case by experiment. There are also useful appendices to this little book, which can be recommended to the practitioner. It is very elegantly got up in soft limp binding.

On Neuroma and Neuro-Fibromatosis.—By ALEXIS THOMSON, F.R.C.S. (Ed.) TURNBULL & SPEARS, Edinburgh, 1900.

THIS excellent monograph consists partly of original work, the result of the author's observation of fifteen cases which came under his care in the Edinburgh Royal Infirmary during the past six years. Unfortunately no case of true neuroma, *i.e.*, a tumour consisting mainly of newly-formed nerve tissue, was included in the cases referred to and, so far as the work relates to such tumours, it represents a compilation from the work of others duly acknowledged in the preface and in the body of the book. The illustrations, photographs and micro-photographs deserve a word of praise all to themselves. We hold that, however good the text of a book may be, its clearness and value are always enhanced by good illustrations. We differ very much in the power of our receptions, and to grasp an intricate idea many readers have to turn the words they read into a mental picture of the thing described. Such persons are relieved of much mental labour by good illustrations. The monograph also reflects great credit on the publishers as it is very well got up. Chapter I is mainly historical but ends with a table of classification dividing neuromata into "true" and "false." The "true" neuromata,

as stated above, are those containing new nerve tissue, and in most cases ganglion cells. These tumours are rare and cause little inconvenience. Their removal is not advocated unless they cause deformity or damage to adjacent tissues by their bulk or peculiar anatomical situation. Accounts of five authentic cases are given. The greater part of the work is taken up with the "false" neuromata which grow from connective tissue elements. These include: *circumscribed*, *diffused* and traumatic nerve tumours; also general enlargements of nerves such as may be seen in certain cases of leprosy, syphilis, or tuberculosis. The *circumscribed* or *solitary* variety may be either innocent or malignant, the latter being sarcomatous in type. The neuroglia tumours that we have been accustomed to call *glioma* and *glio-sarcoma* find no distinct place in Dr. Thomson's classification, but the former is casually mentioned on page 91. Some better name might, we think, have been found for the first division since they are, as the author himself admits, not always solitary. He says:—"The distinctive feature of the numbers of the group under consideration does not consist in the tumour being invariably solitary, but in the absence of any general disease, or tendency to disease, in the peripheral nervous system, such as the neuro-fibromatosis which constitutes the essential lesion in the group which includes the multiple neuromata," pages 15-16. No new light is thrown on the etiology of the 'false' neuromata. They may be hereditary if the evidence given on page 102 is correct as to the relation of cause and effect, and certainly the second of Brun's cases seems fairly conclusive. The disease is confined to the peripheral nervous system, and for this reason Dr. Thomson rejects Feindel's theory of causation as resulting from a primitive malformation of the ectoderm. On the side of comparative pathology, we learn that multiple neuromata are frequently developed in animals, especially in the horse and cow, the disease presenting the same features as in the human subject. The clinical features of neuro-fibromatosis are clearly set forth in lucid paragraphs. These tumours may involute more or less, and according to Michet disappear. He observed such a case in which the site of the tumour was only "recognisable by a depression of the skin, and by insensibility to the prick of a needle." The damage done to the general health is slight as a rule, but when the peripheral nervous system is widely effected, there is naturally an interference with trophic condition leading to cachexia and death may ensue from exhaustion or intercurrent disease. With the class of malignant growths, primary or secondary, we have the usual symptoms of malignant disease, but visceral metastases are said to be exceptional. Two diseases rarely treated of with any fulness in ordinary works will be found in detail, these being elephantiasis neuromatosa and molluscum

fibrosum. Dr. Thomson's book is certainly one of the best monographs that pathology possesses, and for students seeking further details the bibliography at the end of the work will prove most useful.

Medical Electricity.—By H. LEWIS JONES, M.A., M.D. H. K. LEWIS, London. Price, 10s. 6d.

THIS is the third edition of a previous work by W. E. Steavenson, and the present author which was very well received by the medical profession. This edition, by one of the partners in the previous enterprise, had been improved by revision and addition of new matter amounting to 60 pages. One of the most important additions is a chapter on the Roentgen or X-rays. There are, we hope and believe, further fields for the working of this kind of electrical action, and although this book does not pretend to give more than an outline of the origin and working of these rays, the matter is clearly and tersely arranged. The student will have no difficulty in understanding the theory of X-rays, and among students we must include many practitioners whose educational course did not take in medical electricity beyond perhaps some instruction in muscle and nerve reactions. These men were well on their way to fame, indifference or oblivion before many of the discoveries, now taught as a matter of routine, were made; or while they were still only "in the air." Useful advice is given concerning plates, developers, distance for best results and exposure, as this varies for limbs, trunk, &c. Jackson's anti-kathode is illustrated and described, and here we would draw attention to the indiscriminate way in which kathode is spelled either with a 'c' or 'k.' There should certainly be some uniformity, whichever letter the author elects to use. The points to be noted in securing the best apparatus are well given, and there is no doubt that X-ray work can only give reliable results when the best materials are used, as indeed is the case with most scientific work; and any attempt to do things cheaply only results in failure. X-ray tubes are technically classed as 'soft' and 'hard,' and we learn that 'soft' tubes become 'hard' with use. Too 'hard' tubes are to be guarded against for medical radiographs as they fail to give the necessary contrast between the tissues, the rays from them passing through the bones as easily as through the soft tissues. As regards the power of the induction coil, the author's experience leads him to decide in favour of those giving a 6 to a 12-inch spark, and he generally finds the higher power gives the best results. Useful as the X-rays have proved to be to the surgeon, and this has been well shown in many of the hospitals in South Africa, there is hope that they will be equally useful to the physician. The cases already published of cure of lupus show that X-rays may be expected to destroy bacteria in other situations, and it would

be a notable triumph were we able to attack the bacillus of tubercle in his lair. Cases of miliary tubercle scattered throughout a lung present perhaps too great difficulties, but where the disease is localised small cavities might be expected to heal under gentle and prolonged X-ray treatment. Already for diagnostic purposes the X-rays have been proved to possess the power of designating infected spots in the lung which the stethoscope had failed to detect. The first chapter of Dr. Jones' book is historical, clear and concise and free from padding. This is followed by a useful chapter defining the elements of the science of electricity, so that the student should have no difficulty in understanding terms and formulæ as he progresses in his studies. Another chapter is devoted to descriptions of the various batteries, with a table on page 73 which will help to fix their qualities in the memory. Every advice is given as to the choice of a battery, and practical hints supplied as to the care they require. Like many other things they require regular attention which is repaid by finding them ready for use when wanted. Without this the practitioner may find his valuable appliances fail him at a critical time, a disaster easily avoided by care in cleaning and replenishing his batteries at proper intervals. Dynamos; induction coils and machines for static electricity are carefully described, and of the last-mentioned the Holtz, which hails from America seems to be the simplest and best. The medical part of the book beginning with physiology (Chapter VII) is good throughout. Each disease which can be benefited by electricity is taken separately and the treatment described. The illustrations are numerous, always a good feature in a technical work, and we can thoroughly recommend this book to all interested in the various applications of electricity to medicine. The work forms part of H. K. Lewis' *Practical Series*.

Current Literature.

PATHOLOGY AND BACTERIOLOGY.

Non-malarial, Remittent and other Fevers; and the Thalophyte Parasite associated with them.—By E. W. von Tuzelmann. A fever, as

to the nature of which there has been a great difference of opinion, has long been prevalent in China, especially during recent years, being called dengue in Shanghai, and typhoid fever in most of the other treaty ports. In this fever the author has found objects in the red corpuscles of the blood, which are quite unlike Laveran's bodies. These he describes as double contoured circles and crescents of all sizes, some sunk in the substance and others evidently adherent to the surface of the corpuscle, while their white centres do not stain with methylene-blue, and they are never pigmented. Highly refractile rods and reniform bodies, which appeared circular when they are rolled over, were also often seen in the red corpuscles. These bodies are very abundant, as many as 70 to 80 per cent. of the corpuscles being affected even in mild cases, as well as in some healthy persons. After studying these

bodies for a year the writer discovered that by staining the blood of anyone who has lived a few months in North China, with carbol-fuchsin patches of typical fungus, hyphæ laden with spores will be seen. In febrile cases this fungus is much more abundant, and in fatal cases seems to cause death by inducing thrombosis. Some forms of the hyphæ may measure from $\frac{1}{4}$ to $\frac{3}{4}$ inch long, but these do not stain even with carbol-fuchsin. Another characteristic of the parasite is the formation of masses of swarm spores. The spores are present in the blood in millions, and are commonly mistaken for red corpuscles. They are of very varied shapes, being either like crenated red corpuscles, round or hexagonal, saddle shaped, simple tubular bodies with an opening at each end, or reddish-brown reniform bodies, and a sexual mode of reproduction is described in detail. The spores will resist a temperature of 100 C° for half an hour on three successive days, and also 1 per 1,000 solution of quinine, but perchloride of mercury, 1 per 1,000, or 1 in 400 of methylene-blue will kill them. They can very easily be cultivated in bouillon, milk and other media. The range of the parasite is so great that the writer of the paper states that he searched in vain for two years for a single specimen of blood from any warm blooded animal which was free from it, oxen, sheep, pigs, cats, dogs, and fowls being affected as well as man, so that it is not surprising that he found the parasite in gravy from a hot roast joint, or that a drop of boiled milk may look like a pure culture of the organism.

The type of fever, which he attributes to this parasite, is as varying as the forms of the fungus itself, ranging from hardly noticeable attacks of a few hours' duration to those of the utmost degree of severity lasting many weeks, one variety passing by imperceptible gradations into another. He classes them as acute and chronic, the former being divided into four classes in accordance with their severity, while the chronic cases include depressed health and lassitude. Quinine is said to be useless, while methylene-blue alone possesses curative effects.

Un Microbe Pathogene pour les Rats ; et son application a la Destruction de ces Animaux.—By J. Danysz, *Annales de L'Institute Pasteur*, April 1900. An organism was isolated by Loeffler from mice affected by a spontaneous epidemic disease, and termed by him the bacillus typhi murium, and was subsequently used with success for the destruction of *M. Arvicola*. A similar organism which was obtained by the writer was fatal to mice, but less so for rats. When passed through a succession of rats it always lost its virulence after the 10th or 12th passage, and some times by the 5th. The organism after ingestion finds its way into the blood, and if then fatal to the animal, another rat which devours the corpse will be again infected through the intestinal tract, and this alternate passage between the intestine and the blood appears to result in the loss of virulence, for the longer it remains in the blood, the less virulent it is in its action on the intestine. Experiments were undertaken in order to try and increase its virulence, so as to be able to utilize it for the destruction of even the more resistant species of rats. Having found that a virus which kills mice in from four to six days commences to pass from the intestine into the blood at the end of 24 hours after ingestion, he cultivated organisms obtained after this period of time first in bouillon and for 24 hours in the incubator, and then in flask filled to the top for another 24 to 36 hours in the incubator, then at air temperature until at the end of four or five days, the bouillon has become clear and a precipitate has formed. The culture is then enclosed in a collodion sac and placed in the peritoneal cavity of a rat for 24 hours to 36 hours, cultivated anew as before, then grown on gelatine, on which cultures mice are once more fed. On repeating this series of operations several times the virulence is increased, so that it kills mice in 36 to 60 hours instead of in from 4 to 7 days. Then the mice are replaced by young rats,

older ones being eventually used, the virulence being again raised after about a dozen passages through the peritoneal cavity, and in this way he succeeded in making the organism regularly virulent for the grey, the black and even the white rat, although the original culture was only slightly virulent for the first, and not at all for the last two species.

In the laboratory all the rats in a cage are killed on ingesting a culture in from 5 to 12 days, while in closed store houses, in 50 per cent. of the trials all the rats were killed, in 30 per cent. more they were sensibly diminished, while in 20 per cent. the result was negative. In a closed drain 200 grey rats were placed, and remained well for 10 days, after which 20 tubes of the cultures on bread were distributed in the drain, with the result an epidemic was started among the rats, and eventually after a second dose of the cultures all but eight died, many of them being devoured by the survivors, and in the bodies of 40 of them the organism was present in the blood in pure culture, while they showed the usual lesions of the disease, namely, congestions of the intestine, and enlargement of the spleen.

LEONARD ROGERS, M.D., M.R.C.P., I.M.S.

ANNUAL REPORTS,

PUNJAB DISPENSARY REPORT FOR 1899.

THE report on the working of the Punjab dispensaries for 1899 is a brief one, the larger triennial report having been submitted last year. There were 272 dispensaries open at the end of the year, being an increase of five on the previous year. The number of in-patients shows an increase over the former year, especially in Jullundur, Delhi and Amritsar. In some of the best managed institutions there is a need for increased accommodation, while in other places the beds are in excess, not of the real needs of the place, but of the actual attendance. As regards diseases it is extremely satisfactory to see the enormous number of diseases treated, and especially diseases of the eye. This does not mean that diseases of the eye are the most common in the Punjab, but points strongly to the way the public appreciate the good work done in this direction, so much so that patients come from Afghanistan and Chitral to be operated on for cataract. No less than 5,321 operations for cataract were done during the year, out of a total of over 170,000, "selected operation" of all kinds.

Our recent stone number is evidence of the work done in the Punjab on stone in the bladder, in the year under report there were in all 2,113 stone operations, of these 1,844 were litholapaxies, which sufficiently clearly shows that it is the operation of election in the Punjab. The death-rate for litholapaxy was only 3.2 per cent. We are glad to see an improvement in the number of ovariectomies.

It is certainly remarkable that it is a comparatively small hospital at Jullundur, which heads the list of operations, in this hospital no less than 1,570 selected operations were performed, whereas in the much more ambitious and much larger and better endowed hospital, the Mayo hospital at Lahore, only 1,248 operations were done. This splendid result for a small mofussil dispensary appears to be in very large measure due to the energy and surgical repute of Captain Henry Smith, I.M.S., the Civil Surgeon, for we see on the next page of the report that this officer far and away heads the list of operators, with the magnificent total of 1,017 operations in seven months, a record which we think is not to be beaten in any province in India. Other medical officers whose names are high on this list are, Lieutenant-Colonel Perry, Major D. T. Lane, Major A. Coleman, Major W. R. Clarke, Lieutenant-Colonel Little, Major J. A. Cunningham, and Dr. Fattee Chand. A large number of Assistant Surgeons also hand in figures showing well over 200 operations done in the year. In the special report on the Mayo Hospital it is noted that for two years past there has been no death from the operation of litholapaxy.

On the whole, Colonel Franklin is to be congratulated on being able to report on such a fine record of successful surgical work.

THE BENGAL DISPENSARIES REPORT.

COLONEL T. H. HENDLEY, C.I.E., I.M.S., modestly entitles his report on the Charitable Institutions of Bengal only "annotated returns," there is nevertheless much of great interest in them. In the province of Bengal there are 513 dispensaries outside of Calcutti. Colonel Hendley, however, is by no means satisfied to leave them at this number, in a circular, which we quoted from at the time of publication, he gave as his opinion that, as a rule,

no person should be more than 15 or 20 miles from a dispensary, and that every town or rural area of 3,000 inhabitants should have a dispensary, meantime a scheme is being matured to supply simple medicines to the head of villages and for the periodical visits of an itinerant medical officer to visit the more remote parts of districts far from any dispensary. A new and valuable feature in the report is a table which gives the chief meteorological conditions and brief notes on the health of Calcutta and the province. No inferences can, of course, be drawn from such a table for one year only, but if these are continued for a series of years much that is of interest and value connecting the prevalence of disease with meteorological conditions will become available.

We are glad to see a distinct increase in the number of surgical operations done in Bengal, the total this year being 137,123. Of these 2,682 were operations for cataract. Neither cataract nor stone is anything like so common in Bengal as in the North-West and Punjab, but we are glad to see a record of 160 lithotomies, and 102 litholapaxies, of the former 10 died, of the latter only two. There were nine ovariectomies done in mofussil dispensaries during the year.

Colonel Hendley is of opinion that the surgical work of Bengal dispensaries is capable of much further expansion, and the results of the year 1899 show that this surmise is certainly true, and that ere long the records in this line in Bengal will not be far behind those of the N.-W. Provinces. Page xlv of the Report gives the names of medical officers who have done the most surgical operations during the year. Major C. E. Sunder, I.M.S., of Gya, is an easy first with 329 operations to his credit. Next comes Captain Maddox, of Chapra, then Major Harold Brown, and Captain B. H. Deare. Other officers well up on the list are Lieutenant-Colonel Ffrench-Mullen, Major Maynard, Major Walsh, Captain Vaughan and Lieutenant-Colonel Grainger, I.M.S. Colonel Hendley also brings to the notice of Government the good work done by Lieutenant-Colonel R. H. Whitwell, I.M.S., when he was Civil Surgeon of Patna.

Another new and we think useful feature in this report is the list given of the literary contributions of medical officers in Bengal, which have been contributed to our columns and to those of our medical contemporaries. As Colonel Hendley says, "work of this kind is useful and does honour to the Department; and while it is a proof that advantage is taken of the valuable clinical opportunities which are afforded by the district hospitals, it also reflects credit on the officers, who, in spite of heavy duties, find time to contribute to the progress of knowledge." We need only add that our columns are always open for such contributions.

We are glad to note that progress is being made in the writing of the district medical histories in which Colonel Hendley is so much interested.

CALCUTTA MEDICAL INSTITUTIONS.

COLONEL HENDLEY'S Report on the Medical Institutions of Calcutta is as usual interesting. The general health all round was not good, though the considerable increase under the head fevers is probably rightly attributed to plague. The Health Officer of Calcutta is of opinion that there is a five years' cycle in the prevalence of small-pox in Calcutta. A very satisfactory increase of over 31,000 attendances at the hospitals is reported for the year 1899. We are glad to see a substantial increase in the out-door attendance at the General Hospital, which is now open to the public every day in the week. The large increase of over 5,000 patients at the Medical College Hospital is also satisfactory evidence of the excellent arrangements there. Colonel Hendley still sees need of urging further improvements to the accommodation for out-door female patients, till these are satisfactory he rightly believes that full advantage of the medical aid provided will not be taken by the female part of the community.

The statistics for dysentery are very interesting, we note that the case death-rate for this disease is extremely high, *viz.*, 29 per cent., and over 33 per cent. in the former year. This is a fair average rate for this disease when treated in public hospitals, but is extremely high when compared with the death-rate in jails, where the disease is promptly treated. In the jails of Bengal in the same year the death-rate was little over two per cent., and for over 60,000 cases in jails of all India was only 7 per cent. This difference represents the advantage of prompt treatment, the public will not attend the public hospitals when the disease is in the curable state, hence the inevitable high mortality. Prompt and efficient treatment in dysentery means a saving of almost twenty lives in every hundred. This, however, is a matter which is in the hands of the public themselves.

In spite of an alteration in the classification of major operations, there is a substantial increase over 4,000 in the total number performed. There were 387 cataract operations done, 35 abdominal sections, 47 operations for hernia, 67 for abscess of the liver, 13 operations only for stone (which shows the great rarity of stone in Calcutta), 70 for scrotal tumour, 48 on the ovaries and uterus, and 157 obstetric operations. The names of the medical officers at the head of the list of operators are Lieutenant-Colonel Sanders, Lieutenant-Colonel Joubert, Lieutenant-Colonel R. D. Murray, Major R. H. Charles, and Captain R. Bird, Assistant Surgeon N. N. Bose, Miss White, Assistant Surgeon S. S. Mitter, Major D. G. Crawford.

On the whole, we may agree with Colonel Hendley when he writes that "these institutions worked well during 1899, and their management reflects great credit on the staff of officers attached to them."

THE JAIPUR MEDICAL INSTITUTIONS.

THIS report as usual contains very full meteorological observations taken at Jaipur. We are glad to notice a great increase in the number of vaccinations performed. A new small-pox hospital was also opened in 1899, consisting of 17 grass huts. The attendance at all hospitals was a marked increase during the year, owing to the still increasing popularity of these institutions. An admirable system is in vogue in the Jaipur hospital of training the hospital assistants of the mofussil dispensary in the very necessary steps of the after treatment of cataract cases, with the result that the Superintendent in his tours can operate on as many cataracts as he gets without the fear of them being spoiled in the after treatment. This is a hint which might with advantage be taken by Civil Surgeons in other parts of India. There were 396 cataract operations done in the year, with a percentage success of over 93 per cent. Lieutenant-Colonel Pank performs the "3 millimetre flap" operation, as described in Swanny's text-book. There were 44 litholapaxies done during the year, with only one death in a boy with chronic cystitis; the largest stone of the year weighed 1,080 grains.

This interesting report concludes with an account of the measures of plague prevention taken during the year.

MADRAS CIVIL MEDICAL INSTITUTIONS.

THIS report is on the working of the civil medical institutions of the city of Madras. The total number of beds available for the treatment of the sick in Madras city is 1,381: all of which were fully occupied during the year. The slight falling off in the attendance at the General Hospital is attributed by the Principal to the employment of temporary non-service men, new to the country and its ways, and to the increased stringency of the new rule for hospital stoppages, the limit of salary now liable being Rs. 25. It is satisfactory to see the large number of natural labour cases which seek admission to hospitals in Madras. Owing to the alteration in the list of selected major operations, the total appears lower than in former years, nevertheless 16,243 operations are reported for the year. Among those who did the largest number of operations we find Lieutenant-Colonel Pope at the top of the list with 961 operations, 951 of which are cataracts, Captain Niblock, Lieutenant-Colonel Maitland, Lieutenant-Colonel Sturmer, Lieutenant-Colonel Lee, Major R. Robertson, Assistant-Surgeon Falkiner, Civil Apothecary Brown, Assistant-Surgeon K. V. Row and T. M. K. Nedungadi.

Surgeon-General Sinclair is to be congratulated on his first annual report on the Madras hospitals, which is a record of good work all round.

THE N.-W. P. & OUDH DISPENSARIES' REPORT.

THERE are 374 dispensaries of all classes in the N.-W. P. and Oudh, the total number of patients treated being 3,993,665, a considerable increase over the figures for last year. Of the in-door patients, there were 47 per cent. who voluntarily paid for their own diet. There were no less than 180,190 surgical operations performed during the year, of these 5,778 were cataracts. We are glad to see that there were 15 ovariectomies performed by the following medical officers:—Major Lukis, then at Agra, now at Simla, one; Lieutenant-Colonel J. Anderson, at Agra, one; Miss Pierce, three; Lieutenant-Colonel T. H. Sweeney, at Benares, two; Miss K. D. McDowell, one; Assistant-Surgeons Har Persad Nii, RATAN BANERJEE, and S. K. Mukerjee, one each; Major J. J. Pratt, one; Major W. Alpin, two; and Miss Palthorpe, one. There were also 13 important operations on the pregnant uterus, the number of stone operations was 891, of these 438 were litholapaxies, and we are surprised to find 445 cutting operations, including 64 suprapubic operations, 57 of which were cured. This shows that litholapaxy is not performed as often as its great statistical superiority demands, the only reason for this is that a great number of dispensaries are not provided with the necessary lithotrites. We may recall what Dr. Keegan wrote in our Stone Number, that it is the duty of the Local Governments to provide dispensaries with the necessary instruments for doing the operation attended with the least fatality, this much, as Dr. Keegan said, the patient has a right to expect when he comes to hospitals supported out of public funds. The following are the first ten names on the list of operations for the year, though Colonel Hutchison is careful to point out that this is by no means an ideal method of attempting to estimate the work done in a dispensary, the name at the top of the list is Major G. H. Baker, with 804 operations; Lieutenant-Colonel Anderson, 314; Major L. J. Pisani, 278; Major J. F. MacLaren, 262; Lieutenant-Colonel Moriarty, 239; Major J. M. Cadell, 233; Lieutenant-Colonel J. C. C. Smith, 225; Major J. K. Close, 213; Lieutenant-Colonel Sweeney, 212; and Lieutenant-Colonel J. Sykes, 203 operations.

On the whole, Colonel Hutchison can be congratulated on having to report on such an excellent amount of good surgical and medical work.

Correspondence.

"LT.-COL. SPENCER'S CASE OF CONTINUED FEVER."

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—May I offer a few remarks by way of criticism on Lieutenant-Colonel Spencer's article in your issue for September? It seems to me that the deductions he seeks to draw from the case he reports are much too general. The temperature chart and the clinical notes indicate only that the case was one which *might*, from its clinical characters, have been one of enteric fever, but do not show that it was clinically identical with cases generally regarded as enteric fever. The spleen was not enlarged, there were no rose spots, the condition of the tongue is only vaguely described, the motions do not appear to have been characteristic. I quite admit that the absence of these characters does not negative enteric fever, but surely their absence should weigh with Lieutenant-Colonel Spencer as he states that the diagnosis should be based on clinical features and the temperature chart, and only confirmed by the microscope. But one has only to refer to diphtheria and pneumonic plague to find instances of diseases in which the discoveries of bacteriologists have widened our ideas regarding their clinical features. A new conception of the clinical picture has followed fuller investigation of the causative germ. The widest permissible deduction from Lieutenant-Colonel Spencer's article appears to me to be that this case of continued fever in a native was probably neither malaria nor enteric fever. The test for Malta fever was not applied. The failure of Widal's test does not absolutely exclude enteric fever, though it gives a strong presumption that the case was not enteric fever. In a very few cases of clinically typical enteric fever, Widal's test has proved negative. In a larger number of cases a positive reaction has only been obtained late in the disease, sometimes only in convalescence. These points are fully discussed in Cabot's "Serum Diagnosis." In an article on the serum test for enteric fever in the *Indian Medical Gazette* for April 1898, written by Major Melville, R.A.M.C., and myself, several cases are mentioned, in which the first application of the test gave a negative result, but in which a later test gave a frankly positive result. In one of these cases the reaction was negative on the 21st day of disease, but a complete reaction was obtained on the 37th day: the patient died and the *post-mortem* appearances were those of enteric fever and the bacillus typhosus was isolated from the spleen. It is a very wide jump from Lt.-Col. Spencer's one anomalous case—in a native—to the conclusion which he hints at, *viz.*, that "Indian enterica" as seen in British soldiers is not identical with enteric fever elsewhere. This seems to me a dangerous doctrine, and as ill-founded as it is dangerous. At Quetta in 1897 and 1898, Widal's test was applied in a large number—about one hundred altogether—of cases of continued fever, and the lesson learned from it was that many cases of mild continued and anomalous fevers, which might readily have been diagnosed simple continuous or remittent fever were enteric fever: in only one or two cases did the result of the test leave us in doubt. The same results have been reported in Cuba by Drs. Cabot and Vaughan: the continued fevers of soldiers are in the vast majority of cases enteric fever. The *Journal of Tropical Medicine* for July and August of this year contains an article by Dr. Rho of the Royal Italian Navy, in which he shows that the same holds good for the fevers prevalent among the Italians at Massowah.

I would further add that the supposed clinical differences between "Indian enteric fever" and enteric fever as seen in England have been much exaggerated. Any one who has seen a large number of cases of enteric fever in England can recall anomalies and varieties corresponding to those found out here. Malarial fever as a complication occasionally imports an element of difficulty in diagnosis in India, but the serum test and the microscopic examination of the blood combined will clear matters up.

I am, &c.,

J. G. McNAUGHT, CAPT.,

R.A.M.C.

THE PLAGUE PROBLEM RESTATED WITH SOME
EXPERT ERRORS.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—Let it be, at the outset, granted that the *causa causans* of Plague is the germ or diplo-bacillus demonstrated by Kitasato and Yersin; and it would not be easy to enumerate the errors into which this radical fact has led the medical profession owing to its being pushed beyond its legitimate place as a factor in Plague causation. Until and unless all the factors, primary and secondary, in Plague causation and propagation are duly

subordinated to each other and given their relative importance by epidemiologists, our efforts to combat a threatened invasion or accomplished epidemic of the disease must be spasmodic, without method, and futile. No one doubts that, for the explanation of the advent of the disease, the diplo-bacillus is all-important and necessary, and connotes our knowledge with that of other infectious diseases. Granted that the germ exists; and it has been identified and personally submitted to now differential tests without one's becoming so enamoured of its behaviour as to ignore secondary and preventible causes of Plague causation and propagation. One might formulate the axiom "no germ, no Plague." Let us not forget, however, that its virulence, or potency to attack, is circum-cribed, conditioned, dependent on environment. The axiom "no favouring conditions, no Plague" is equally true; although the germ may be abundantly present.

Bacteriologists very truly state that, *under laboratory conditions*, certain chemical disinfectants in certain strengths kill the Plague germ; but they are not to be believed when they jump the wide breach between sterilized test-tubes and the cow-dunged floor of a Plague-infected dwelling.

As a prominent bacteriologist said, when asked if his experiments with chemical disinfectants could throw any light on the treatment of the disease, "Laboratory test-tubes are not human bodies." Neither, one may reply indubitably, are they native huts.

Lakhs of rupees have been wasted in the use of vaunted disinfectants without tangible results. Because French bacteriologists found spraying of the walls with perchloride solution useful in scarlatina and measles the medical world argued that by analogy the same would be satisfactory in other epidemic diseases.

No one could refuse to use disinfectants if efficient ones could be discovered for practical use. There are so many loop-holes for mistakes in their use, in addition to those hinted at, such as just missing the probably only badly infected article when our efforts become love's labour lost. All lines of defence against Plague infection are ideally perfect until put into practice when most of them break down. What more secure apparently than a sanitary cordon to keep the germ out. Yet no sanitary cordon is germ proof; and still less so in modern times owing to the enormous increase of intercommunications due to extensive commerce and the introduction of steam and increased travelling facilities. It should be just as easy to stop Plague in the beginning as to extinguish a fire—the earlier both are attacked the better. Once the conflagration has spread beyond a certain limit it must burn itself out as long as any inflammable materials remain.

To revert to the analogy of the burning house one might reflect and discover why the house caught fire at all, and to be led to build one of non-inflammable materials which would for ever afterwards resist conflagrations. This is the reliable proposal with regard to Plague prevention based on a tested theory of its causation and prevalence and leading to radical sanitary reform, chiefly, in the habits of the people in regard to fresh air at all times; and the structural defects of their habitations. It may be sneered at as impracticable; pooh-poohed at as like one crying in the wilderness; but increasing experience everywhere is now proving to full conviction that every other measure is unreliable.

It is not to be wondered at that Plague continues and spreads when educated medical men cannot see the reasons for the comparative immunity of Europeans and others. They are driven to account for it by inventing "an alteration of constitution" hypothesis, rather than recognize the alteration of environment produced by improved sanitation and personal hygiene. It took many years for the English, aided by a great fire (amongst an educated community) which gave the opportunity to London to set an example to other infected areas, to put their houses in order and get rid of Plague. Even now many Europeans deny or are wholly ignorant of the reasons for their own comparative immunity, so that it would require years of preaching to remove the prejudices of the ignorant masses and their ingrained hatred of fresh air. That disinfectants have had a fair trial no one can deny. A young child swallowed about $\frac{1}{2}$ grain of our stock of Hgcl₂ and became very ill and salivated; yet a young heifer drank upwards of 1½ gallons of the same drug, in a 1 in 996 solution, without any untoward ill-effects. The solution was mixed with all precautions in a wooden tub with clean tap water and was completely dissolved by the aid of ammonium chloride. It was with pea-soup like water from a turbid and swollen Indian river in the rains that some Plague administrators disinfected towns, and attributed their success to the use of such solutions of Hgcl₂. This careful (?) use of such solutions in different series elaborated into case disinfection, and general disinfection had no effect, however, in preventing fresh outbreaks without re-infection from without in the same towns—and this seems a very essential and desirable quality in any disinfectant. It should be something more than ephemeral and evanescent in its action. Other measures used in conjunction with disinfection get little or no credit with a believer in disinfection—the purblind follower of a pet panacea is not above a suppressio veri. When driven to a corner by the fact that Plague does attack Europeans instead of acknowledging the almost invariable breach or

sanitary laws as the precipitating factor in an individual attack, they say that such particular individual has not undergone the necessary "change of constitution."

The most important fact about Plague, as about most infectious diseases, is that its powers towards virulence are conditioned, that only under certain circumstances is it armed with malignancy.

That a certain degree of ground temperature and moisture has something to do with its virulence is seen by the difference in the mildness of Plague as met with in some places compared with others, e.g., Calcutta and Bombay. It is seen also that in spite of rigorous disinfection, &c., Bombay Plague goes on increasing and reaches its maximum at or soon after the coldest period of the year, but mark the height of the hot weather in modifying the sleeping habits of the people and causing an immediate and marked decline in plague. This is true generally of all places with a variable climate which forces the people to sleep out in the fresh air. Karachi, with a much less variable climate, shows no such variation, as its extremes are not sufficient to influence in any marked degrees the habits of the people as regards sleeping in or out of their ill ventilated houses, hence the middle of the hot season marks the height almost of the Karachi epidemics, generally leading them to enjoy fresh air habitually, one was met with individual instances to the contrary. Europeans are not exempt from Plague when they live under the conditions necessary for its development.

The crux of the whole problem is the proper appreciation of secondary controllable causes and the analogy of Pneumonic Plague with the malignant varieties of other epidemic infections. For such varieties of disease ordinary laws do not hold—there is no legislating for them. We must and they help us to explain otherwise attacks; whilst giving no reason are rare and exceptional.

All measures yet tried have their place in dealing with Plague but should not obscure the only real safeguard—perfect sanitation—which so alters the environment that the germ cannot attack. To those who cannot or will not adopt these supreme sanitary precautions which everywhere and always protect everyone from preventable Plague, the resort to inoculation with Haffkine's Plague prophylactic serum is a very important protective measure. Granting that it protects 99 per cent of those resorting to it, what is the remaining one to do, and after all it is only a temporizing measure, not a radical, effectual, defiance to Plague. Disinfection by super heated steam, by fire—as in the Hyderabad kiln process—or other reliable means would be perfect if applicable, and permanent in action, making a place to which they had been applied Plague proof. Reliable chemical disinfectants are not at present at our disposal, and the lamentable waste of money that might have been usefully employed, in building Plague proof dwellings for the poor, is appalling. No doubt, the perfect sanitary dwelling would soon be made insanitary by the ignorant inhabitants. Any of the measures, inoculation at its best even, is like pouring water on the inflammable materials of a burning house, it is not the construction of a fire resisting dwelling,—and cannot ward off future attacks in the community or individual. Evacuation of the infected site is a useful measure; sometimes it is successful, and at other times it fails. Why? Unless the people have been removed into well ventilated, sanitary huts, it only produces a temporary lull in the virulence of the epidemic. What is the use of evacuating dwellings that were hot beds of Plague because of their structural defects and removing the people to equally or nearly as badly constructed huts? Without a grasp of their source of safety the ignorant people soon render sanitary huts incubators of Plague by their shutting up almost all air inlets, hanging curtains round to exclude air and light, and hence they develop fresh Plague even long after the period of safe detention under observation is past. Without the education of the masses, and an enlistment of their sympathies on the side of truth for their own salvation, and sanitary progress, our best directed efforts are vain as regards permanent results. When experts in Plague shall have conscientiously answered the following questions, they shall have gone far towards ridding minds of medical cant and faddism, and to attaining a better appreciation of the relative importance of repressive Plague measures and Plague theories:—

- (1) Is Plague epidemic and non epidemic?
- (2) " preventable and non preventable?
- (3) " malignant, and non malignant?
- (4) " inoculable, and non inoculable?
- (5) " infectious, and non infectious?
- (6) " curable, and incurable?
- (7) " a filth, and non filth disease.

A ripe experience will enable one to give an affirmative answer to all those apparently contradictory questions, the last requires the questioner to define what he means by filth before an intelligible rejoinder can be given. In one sense it is certainly not a filth disease—the most filthy are often particularly immune. Very clean Brahmans are attacked, and very filthy Halalkores to a great extent comparatively exempt.

That theory of disease causation that harmonizes all the known facts, and best helps us to understand the apparently con-

tradictory phenomena and vagaries of incidence and immunity of any infection under investigation is the one to challenge criticism and gain credence when it answers all objections. The theory herein maintained has stood the test of time and been confirmed by facts at first sight most calculated to completely upset it.

The damp theory won't hold water; the diseased grain theory is rotten, the want-of fresh air theory remains unshaken by all the assaults of time and criticism.

The combating of Plague by solutions of HgCl₂ made with Indran river water in the rains is as useful as pumping rose water through a garden hose, and radical sanitary reform, based on the true theory of the causation of the disease is applicable at all times, during the rains as well as in the hot season, so that the answer to one of the pet questions of a very astute member of the Plague Commission—"What would you do during the rains?"—is universally true—Sanitate—Sanitate—Sanitate.

GEO. S. THOMSON.

MUSSOOREE.

MAJOR, I. M. S.,

14th Bombay Infantry.

Service Notes.

THE following Medical Officers, I. M. S., have been ordered out from furlough in England to meet the demands upon the Department owing to the China Expedition. Other officers on furlough remain either on medical certificate or are detained on public duty—

Military Department	Surgeon General Spencer.
	Lieut.-Col. Haig.
	Lieut. Col. Eyre.
	Capt. Macnab.
	Capt. H. G. Melville.
	Capt. Fisher.
Foreign Department	Lieut.-Col. Benson.
	Major Shore.
Finance Department	Lieut. Col. MacCartie.
Home Department	Lieut. Col. Ranking.
Medical Stores Department	Major G. H. Dobson.
Madras (Civil)	Lieut.-Col. Lea.
Bombay (Civil)	Major A. V. Anderson.
	Major Grayfoot.
	Capt. Jackson.
	Capt. J. B. Smith.
	Lieut. Col. Nariman.
Bengal (Civil)	... Lieut. Col. E. Bovill.
	Lieut. Col. T. Grainger.
	Lieut.-Col. Lewtas.
	Major D. G. Crawford.
	Major Drury.
	Major Clarkson.
N.-W. P. & Oudh (Civil)	Lieut. Col. G. Hall.
	Lieut.-Col. Thompson.
	Lieut.-Col. Brandei.
	Major Alpin.
	Major Vost.
	Capt. H. B. Melville.
Punjab (Civil)	Lieut. Col. Denny.
	Major Braide.
	Lieut. Col. Doyle.
	Major Coleman.
Burma (Civil)	Major Bensley.
	Major Evans.
	Major Castor.
	Capt. C. Duer.
Assam (Civil)	Lieut. Col. R. N. Campbell.
	Lieut. Col. Macnamara.
	Major C. Hare.
	Major Carroll.

CHINA EXPEDITIONARY FORCE.

We are indebted to Major Ker, I.M.S., for the following Nominal Roll of Medical Officers of the China Field Force.

Details	Names	Commands.
P.M.O. of the Force	Col. J. T. B. Bookey, I.M.S.	Bengal.
P.M.O., Line of Communications	Col. H. F. P. H. Esmonde White, I.M.S.	Madras.

Details.	Names.	Commands.	Details.	Names.	Commands.
<i>Cavalry Brigade—</i>			No. 61 Native Field Hospital ...	Lient.-Col. H. Armstrong, I.M.S. ...	Madras.
3rd Bombay Cavalry	Capt. H. F. Cleveland, I.M.S. ...	Bombay.		Capt. R. Bryson, I.M.S. ...	Madras.
16th Bengal Lancers	Lieut. R. F. Baird, I.M.S. ...	Punjab.		Capt. S. P. James, I.M.S. ...	Madras.
Section "A," No. 22 British Field Hospital ...	Maj. J. M. Reid, R.A.M.C. ...	Punjab.		Lieut. A. Williams, I.M.S. ...	Madras.
Sections "A" and "B," No. 57 Native Field Hospital ...	Lient.-Col. D. B. Spencer, I.M.S. ...	Bengal.	<i>4th Infantry Brigade—</i>		
	Capt. C. D. Dawes, I.M.S. ...	Bengal.	28th Madras Infantry	Lieut. T. S. Ross, I.M.S. ...	Madras.
<i>1st Infantry Brigade—</i>			31st Madras Infantry	Lieut. P. K. Chitale, I.M.S. ...	Madras.
7th Bengal Infantry	Capt. H. J. Walton, I.M.S. ...	Bengal.	No. 53 Native Field Hospital ...	Lieut.-Col. D. P. Warlicker, I.M.S. ...	Madras.
24th Punjab Infantry	Major H. F. Whitechurch, I.M.S. ...	Punjab.		Capt. J. Entrican, I.M.S. ...	Madras.
1st Sikh Infantry	Capt. W. H. Kenrick, I.M.S. ...	Punjab.		Capt. T. H. Foulkes, I.M.S. ...	Madras.
26th Bombay Infantry	Capt. E. G. R. Whitcomb, I.M.S. ...	Bombay.		Capt. C. G. Webster, I.M.S. ...	Madras.
No. 39 Native Field Hospital ..	Maj. W. W. White, I.M.S. ...	Bengal.	No. 58 Native Field Hospital ...	Maj. P. Mullane, I.M.S. ...	Bengal.
	Capt. J. A. Hamilton, I.M.S. ...	Bengal.		Capt. J. J. Bourke, I.M.S. ...	Bengal.
	Lieut. D. McCay, I.M.S. ...	Bengal.		Lieut. T. H. Delany, I.M.S. ...	Bengal.
	Lieut. C. H. Stewart, I.M.S. ...	Madras.		Lieut. J. C. H. Leicester, I.M.S. ...	Bengal.
No. 43 Native Field Hospital ...	Maj. F. Wyville Thomson, I.M.S. ...	Bengal.	Sections "C" and "D," No. 62 Native Field Hospital ...	Capt. H. A. F. Knapperton, I.M.S. ...	Bombay.
	Capt. W. Carr, I.M.S. ...	Bengal.		Lieut. W. H. Cox, I.M.S. ...	Bombay.
	Lieut. H. B. Meakin, I.M.S. ...	Bengal.	<i>Divisional Troops—</i>		
	Lieut. W. S. Wilmore, I.M.S. ...	Bengal.	1st Bengal Lancers	Maj. G. T. Mould, I.M.S. ...	Bengal.
<i>2nd Infantry Brigade—</i>			1st Madras Pioneers	Capt. F. L. Blenkinsop, I.M.S. ...	Madras.
2nd Bengal Infantry	Lieut. C. Hudson, I.M.S. ...	Bengal.	Section "B," No. 22 British Field Hospital ...	Lieut.-Col. W. J. R. Rainsford, R.A.M.C. ...	Bengal.
14th Sikhs ...	Lieut. W. R. Battye, I.M.S. ...	Punjab.	No. 42 Native Field Hospital ...	Maj. D. G. Marshall, I.M.S. ...	Punjab.
1-4th Gurkha Rifles	Capt. V. E. H. Lindsay, I.M.S. ...	Punjab.		Capt. S. A. Harriss, I.M.S. ...	Punjab.
30th Bombay Infantry	Capt. T. H. Sharman, I.M.S. ...	Madras (H. C.).		Capt. A. H. Moorhead, I.M.S. ...	Punjab.
No. 63 Native Field Hospital ...	Maj. H. Greany, I.M.S. ...	Madras (H. C.).		Lieut. H. A. G. Gidney, I.M.S. ...	Bombay.
	Capt. W. S. P. Ricketts, I.M.S. ...	Bombay.	<i>Line of Communication—</i>		
	Capt. T. W. Irvine, I.M.S. ...	Bombay.	22nd Bombay Infantry	Lieut. J. Sloan (X), I.M.S. ...	Bombay.
	Capt. P. P. Kilkelly, I.M.S. ...	Bombay.	3rd Madras Infantry	Maj. J. K. Kanga, I.M.S. ...	Madras.
No. 66 Native Field Hospital ...	Lieut.-Col. E. M. Damla, I.M.S. ...	Madras.	5th Infantry, Hyderabad Contgt....	Capt. H. R. Brown, I.M.S. ...	Madras (H. C.).
	Capt. A. Miller, I.M.S. ...	Madras.			
	Lieut. L. L. Elwes, I.M.S. ...	Madras.	Sections "A" and "B," No. 15 British Field Hospital ...	Capt. L. A. Mitchell, R.A.M.C. ...	Punjab.
	Lieut. G. P. T. Groub, I.M.S. ...	Madras.		Capt. G. Dansey-Browning, R.A.M.C. ...	Punjab.
<i>3rd Infantry Brigade—</i>			Sections "C" and "D," No. 69 Native Field Hospital ...	Capt. F. R. Ozzard, I.M.S. ...	Punjab.
6th Bengal Infantry	Lieut. T. Hunter, I.M.S. ...	Bengal.		Capt. S. Anderson, I.M.S. ...	Punjab.
4th Punjab Infantry	Lieut. J. N. Walker, I.M.S. ...	Punjab.	No. 47 Native Field Hospital ...	Maj. G. E. Fooks, I.M.S. ...	Bombay.
20th Punjab Infantry	Capt. J. G. P. Murray, I.M.S. ...	Bengal.		Capt. G. W. Jenney, I.M.S. ...	Bombay.
34th Pioneers ...	Lieut. G. Hutcheson, I.M.S. ...	Punjab.		Lieut. De Vere Condon, I.M.S. ...	Bombay.
No. 51 Native Field Hospital ...	Maj. I. G. Maidment, I.M.S. ...	Madras.		Lieut. G. E. Stewart (X), I.M.S. ...	Bombay.
	Capt. C. R. Bakhle, I.M.S. ...	Bombay.			
	Lieut. S. Hunt, I.M.S. ...	Bombay.			
	Lieut. A. G. Sargent, I.M.S. ...	Bombay.			

Details.	Names.	Commands.	Details.	Names.	Commands.
Sections "A" and "B," No. 38 N. F. H. ...	Capt. J. Mulvany, I.M.S. ... Lieut. H. M. Cruddas, I.M.S. ...	Punjab. Punjab.	I Base Depôt of Medi- cal Stores ...	Maj. J. T. Daly, I.M.S.	Bengal.
No. 41 N. F. H. ...	Maj. G. N. E. McKee (X), I.M.S. ... Capt. M. B. Pinchard, I.M.S. ... Lieut. W. H. Tucker, I.M.S. ... Lieut. G. C. Beamish, I.M.S. ...	Madras. Madras. Madras. Madras.	Coolie Corps— No. 54 N. F. H. ...	Maj. G. S. Thomson, I.M.S. ... Capt. W. H. Ogilvie, I.M.S. ... Capt. W. B. Turnbull, I.M.S. ... Capt. J. A. Dredge, I.M.S. ...	Bombay. Punjab. Punjab. Madras.
Sections "C" and "D," No. 57 N. F. H. ...	Lieut. A. G. McGil- christ, I.M.S. ... Lieut. F. S. C. Thomp- son, I.M.S. ...	Bengal. Bombay (20th Bo. I.).	Siege Train— Sections "A" and "B," No. 69 N. F. H. ...	Maj. H. Fooks, I.M.S. Capt. R. G. Turner, I.M.S. ...	Punjab. Punjab.
Br. Genl. Hospl. ...	Maj. H. E. Cree, R.A.M.C. ... Capt. F. R. Buswell, R.A.M.C. ... Capt. C. G. Spencer, R.A.M.C. ...	Madras. Madras. Bengal.	Hospital Ships— "Carthage" ...	Maj. W. A. Sykes, I.M.S. ... Capt. W. E. Scott- Moncrief, I.M.S. ... Capt. C. H. Evans, I.M.S. ... Lieut. E. F. G. Tucker, I.M.S. ...	Punjab. Punjab. Punjab. Bombay.
No. 1 Native General Hospitals.	Lieut.-Col. L. A. Wad- dell, I.M.S. ... Maj. J. A. Burton, I.M.S. ... Maj. A. W. Dawson, I.M.S. ... Maj. F. W. Geo, I.M.S. ... Capt. F. A. Watling, I.M.S. ... Capt. A. Fenton, I.M.S. ... Lieut. J. W. D. Megaw, I.M.S. ... Lieut. S. R. Douglas (X), I.M.S. ... Lieut. A. E. Walter (X), I.M.S. ... Lieut. E. O. Thurston, I.M.S. ...	Bengal. Madras. Bengal. Bengal. Bengal. Bengal. Bengal. Madras. Bengal. Punjab. Punjab. Bengal.	"Gwalior" ...	Lieut.-Col. A. M. ... Crofts, I.M.S. ... Maj. G. J. Coates, R.A.M.C. ... Capt. C. M. Moore, I.M.S. ... Lieut. G. Tate, I.M.S.	Bengal. Bengal. Bombay. Punjab.
No. 2 ...	Lieut.-Col. H. Hamilton, I.M.S. ... Maj. S. C. Nandi, I.M.S. ... Capt. F. Wall, I.M.S. Capt. C. A. Johnston, I.M.S. ... Capt. J. M. Woolley, I.M.S. ... Capt. F. H. G. Hut- chinson, I.M.S. ... Lieut. G. McPherson, I.M.S. ... Lieut. J. W. F. Rait, I.M.S. ... Lieut. W. F. Mc- Kechie, I.M.S. ... Lieut. P. P. Atal, I.M.S. ...	Bengal. Bengal. Madras. Madras. Bengal. Bombay. Bombay. Bengal. Punjab. Madras. Madras. (H. C.)	American Ladies' Hospital Ship <i>Maine</i> ...	Maj. J. Meek, R.A.M.C., and two American Surgeons.	
No. 3 ...	Lieut.-Col. F. W. Wright, I.M.S. ... Maj. B. K. Basu, I.M.S. ... Capt. J. L. Macrae, I.M.S. ... Capt. T. E. Watson, I.M.S. ... Capt. F. A. L. Ham- mond, I.M.S. ... Capt. W. G. Richards, I.M.S. ... Capt. F. D. Browne, I.M.S. ... Lieut. D. N. Anderson, I.M.S. ... Capt. N. P. O'G. Llor, I.M.S. ... Capt. V. H. Roberts, I.M.S. ...	Bengal. Bengal. Madras. Madras. (H. C.). Madras. Madras. Madras. Madras. (H. C.). Madras. Punjab.			

"FORTUNES THAT ONCE USED TO BE REALISED IN INDIA."

SUCH is the headline to p. 127 of the 1st Vol. of the long extinct *Indian Journal of Medical and Physical Science*, edited by Frederick Corbyn, Esq., and published in Calcutta in the year 1836. There was a series of articles running through the Journal on the constitution of the Medical Department of the Hon. Company's Service. In 1770 the Board of Directors were far from particular as to who was chosen for the Medical Department, "one person passed the Board who had been a butcher on board of an East Indiaman, and was so ignorant that he signed himself 'Sergeant' instead of Surgeon." In 1795 the Board ordered that no one should be appointed who had not the diploma of the leading College of London, Dublin or Edinburgh.

At the same time Government gave to Regimental Surgeons contracts for the purveying of hospitals and the supply of European and bazar medicines. "In consequence of this arrangement some of the Surgeons from a state of absolute distress soon found themselves in receipt of enormous salaries, for such was the paucity of Surgeons at the time that several offices fell to the lot of one individual, and for each he received a full allowance. "In Lord Lake's camp such were the enormous receipts in consequence of these contracts for supplying corps with medicines, diet and doolies that Drs. Monroe and Cockrane especially realised 'the largest fortunes ever made in the country. The intelligence of such brilliant fortunes soon reached Britain. Gentlemen of the first families sent their sons to study medicine; the Indian Service was soon filled with accomplished and able men; indeed such was their literary acquirements that many were employed in the Political Department, while the press and houses of agency were principally conducted by them."

These prosperous times did not last long, and in 1815 the contract system ceased for medical officers, and no compensation was offered.

THE Queen has approved of the retirement of Lt.-Col. J. F. Tuohy, I.M.S., from 24th June 1900.

DR. C. CHRISTY and Dr. H. Coghill are appointed to act for Civil Surgeons in Ahmednagar and Karwar Districts, and Dr. G. W. Lewis to act as Special Health Officer, Karachi.

DR. S. S. NIGHTINGALE is appointed to act for the Civil Surgeon of Ahmedabad.

CAPT. A. R. S. ANDERSON, I.M.S., is appointed to be S. M. O., Andamans.

CONSEQUENT on the employment on Lord Roberts' Staff in South Africa of Major W. R. Edwards, I.M.S., (Capt. W. E. A. Armstrong, I.M.S., acts *sub. pro tem.*) as an Agency Surgeon, 1st class, and Capt. G. Ramsay, I.M.S., as Agency Surgeon, 2nd class.

LIEUT.-COL. C. J. McCARTIE, M.D., I.M.S., has retired from the Service from 26th June.

DEPUTY SURGEON-GENERAL HENRY CAYLEY, I.M.S. (*retd.*), has been appointed Honorary Surgeon to the Queen, *vice* Surgeon-Major A. Grant, deceased.

THE following Lieutenants have been promoted Captains, I.M.S.:

J. G. P. Murray.	S. Anderson.
F. H. G. Hutchinson.	J. L. Majoribanks.
A. Fenton.	J. A. Dredge.
R. W. Knox.	

CAPT. B. G. SETON, I.M.S., 1st C. I. Horse, has been granted six months' sick leave to England.

CAPT. A. W. R. SEDGEFIELD, I.M.S., Civil Surgeon of Budaon, was granted four months' leave on medical certificate, and Capt. Stuart Dallas for one year (*m. c.*).

WE see it mentioned that Dr. Arthur Powell, of Cachar, who went out as medical officer of Lumsden's Horse, is likely to receive a good appointment in South Africa. For his sake we hope so; but if so we shall lose a frequent and valued contributor.

THE services of the undermentioned officers are placed temporarily at the disposal of the Military Department:

Lieut.-Col. Dharmadas Basu, I.M.S. (Bengal.)
 Maj. Hem Chandra Banerji, I.M.S. (Bengal.)
 Capt. H. M. Earle, I.M.S. (Bengal.)
 Capt. C. B. Prall, I.M.S. (Bengal.)
 Capt. P. St. C. More, M.B., I.M.S. (Bengal.)
 Capt. J. Davidson, M.B., I.M.S. (Bengal.)
 Capt. T. H. Foulkes, I.M.S. (Madras.)
 Capt. W. Selby, D.S.O., I.M.S. (Bengal.)
 Capt. E. J. Morgan, M.B., I.M.S. (Bengal.)
 Capt. E. E. Waters, M.B., I.M.S. (Bengal.)
 Capt. T. E. Watson, M.B., I.M.S. (Madras.)
 Capt. C. G. Webster, I.M.S. (Madras.)
 Maj. K. H. Mistry, I.M.S. (Bombay.)
 Capt. S. E. Prall, I.M.S. (Bombay.)
 Capt. A. Hooton, I.M.S. (Bombay.)
 Capt. A. F. W. King, I.M.S. (Bombay.)
 Lieut. H. Kirkpatrick, M.B., I.M.S.
 Lieut. F. D. S. Fyrrer, I.M.S.
 Lieut. W. Lethbridge, M.B., I.M.S.

THE services of the undermentioned officers are replaced at the disposal of the Military Department:

Capt. F. N. Windsor, M.B., I.M.S. (Bengal.)
 Capt. W. W. Jamesha, M.B., I.M.S. (Bengal.)
 Capt. J. C. Robertson, M.B., I.M.S. (Bengal.)
 Capt. N. R. J. Rainier, I.M.S. (Bengal.)
 Capt. F. A. L. Hammond, I.M.S. (Madras.)
 Capt. W. G. Richards, I.M.S. (Madras.)
 Capt. F. D. Browne, M.B., I.M.S. (Madras.)
 Capt. E. F. E. Buines, I.M.S. (Bombay.)
 Capt. G. O. F. Sealy, I.M.S. (Bombay.)
 Lieut. E. F. G. Tucker, I.M.S.

OWING to the demands of the Military Department for the war in China the following medical officers have been recalled from Civil to Military duty:—

Capt. E. A. R. Newman, I.M.S. (Bengal.)
 Capt. Clayton Lane, I.M.S. (Bengal.)
 Major N. P. Singha, I.M.S. (Bengal.)
 Capt. B. R. Chatterton, I.M.S. (Bengal.)
 Capt. K. V. Kirkday, I.M.S. (Bombay.)
 Capt. T. A. Grainger, I.M.S. (Assam.)
 Capt. H. M. Moore, I.M.S. (Bombay.)
 Capt. R. H. Price, I.M.S. (Bombay.)
 Capt. E. C. MacLeod, I.M.S. (Assam.)
 Maj. H. C. Hudson, I.M.S. (Port Blair.)
 Capt. D. C. Johnston, I.M.S. (Rajputana.)
 Capt. J. A. Black, I.M.S. (Rajputana.)
 Capt. C. H. S. Lincoln, I.M.S. (Beluchistan.)
 Capt. J. M. Crawford, I.M.S. (N.-W. P. & Oudh.)
 Capt. J. S. S. Lumsden, I.M.S. (N.-W. P. & Oudh.)
 Capt. C. Milne, I.M.S. (N.-W. P. & Oudh.)
 Capt. H. Austen-Smith, I.M.S. (N.-W. P. & Oudh.)

Capt. J. L. Majoribanks, I.M.S. (Bombay.)
 Maj. R. J. Marks, I.M.S. (N.-W. P. & Oudh.)
 Maj. G. B. French, I.M.S. (N.-W. P. & Oudh.)
 Maj. J. Garvie, I.M.S. (N.-W. P. & Oudh.)
 Capt. G. T. Birdwood, I.M.S. (N.-W. P. & Oudh.)
 Capt. C. Thompson, I.M.S. (N.-W. P. & Oudh.)

THE undermentioned probationers for the Indian Medical Service, having completed a course of instruction at the Army Medical School, and being reported qualified, have been appointed Lieutenants, their commissions being dated the 28th June 1900, the day on which they passed out of the Army Medical School:—

James Drummond Graham (Bengal).
 Cuthbert Allan Sprawson (Bengal).
 Maxwell Mackelvie (Bengal).
 William Lapsley (Bengal).
 William Henry Cazaly (Bombay).
 Percy Alfred Brown (Punjab).
 Walter Valentine Copping (Bengal).
 Alfred Spittler (Bombay).
 James Charles Stewart Oxley (Punjab).
 Henry Richard Macnee (Punjab).
 Leonard Joseph Montagu Deas (Punjab).
 William Mitchell Houston (Bombay).
 William David Acheson Keys (Bombay).
 George Joseph Grafton Young (Bombay).
 James Good (Madras).
 Alexander Chalmers (Madras).
 William Gavin Hamilton (Madras).
 Samuel Robert Godkin (Madras).

MAJOR D. G. CRAWFORD, I.M.S., whose knowledge of the history of the Indian Medical Service is marvellous, sends us the following list of medical officers of the Bengal Medical Service who were killed or died on service during the Mutiny, this list being supplementary to that in our columns for July (p. 279):—

1. Surgeon Thomas Smith, invalided in India, 15th March 1857, killed at Meerut, 10th May 1857.
2. Surgeon William Amys Rolfe, killed by mutineers, Residency, 4th August.
3. Assistant-Surgeon William Boyle Chavasse, died at Meerut, 2nd November 1857.
4. Assistant-Surgeon William Gardiner Morris, died at Delhi, 31st August 1857.
5. Assistant-Surgeon W. J. Shaw, died at Lucknow, 22nd November 1857.
6. Assistant-Surgeon T. H. Woodward, killed in action, Delhi, 31st August.
7. Assistant-Surgeon H. T. Cary, killed at Mehidpur, 8th November 1857.

In addition to this Assistant-Surgeon W. W. Ireland was returned as killed in action at Delhi on 26th July 1857.

This was erroneous, as Dr. Ireland recovered and retired from the Service on 1st August 1861. He is still alive, and has published many books on Lunacy, especially the well known "Blot upon the Brain," "Through the Ivory Gate," also a "History of the Siege of Delhi," and numerous papers in the medical press. He is an M. D. of Edinburgh (1855), and now resides in Midlothian.

WE are glad to see that the prominent part taken by Indian Medical Service officers in the Tropical Section of the recent British Medical Association Meeting is recognised. Our contemporary, the *Journal of Tropical Medicine*, writes: "It is with satisfaction that we point to the important part taken in the work of the Tropical Section by members of the Indian Medical Service the reputation of the contributors was a guarantee of the excellence of the quality of the communications."

THE same journal also recognises that Dr. Manson justly put forward the rival yet independent claims of Dr. G. C. Low, of the London Tropical School, and of Capt. S. P. James, I.M.S., of Quilon, to the discovery of the metamorphosis of the flaria nocturna in the mosquito, and especially its probable escape by means of the proboscis. When we consider that Capt. James' discovery was made, quite unaided, in the spare time he could snatch from his other duties, in a small extemporised laboratory in his own bungalow, and entirely at his own expense, we are glad that a full measure of recognition is accorded to his work.

As an example of the difficulties in the way of original investigation in India we may mention that Capt. James had just commenced a series of experiments with the object of inducing elephantiasis or filariasis in monkeys by means of the mosquito when he was suddenly ordered off on field service to China.

WE are glad to learn that Mr. K. Zorab, who went out with Lumsden's Horse, (a son of Lt.-Colonel J. M. Zorab, I.M.S., of Cuttack,) is now in good health. He was invalided home, having

been attacked with fever he was captured by the Boers who, he says, treated him well, and released him shortly afterwards.

THE following is worth quoting from the August issue of the *Polyconist*, edited by Mr. Jonathan Hutchinson, F.R.C.S. :—
 Mr. BURDETT COUTTS' MUD.—One of the statements in Mr. Burdett Coutts' letter which most impressed the readers' imagination was that in which he averred that he had seen the sick lying in "three inches deep of mud."

“One of the witnesses before the Commission has disposed of this statement by roundly asserting that there is no mud in the country, the dry sandy soil of the district not being suitable to make ‘mud’ of. Let us hear, however, how Mr. Coutts himself explains away his most disquieting statement. According to the report in the *Daily News* he said in reply to the President’s query, ‘You spoke about patients lying in three inches of mud?’ ‘Yes, it was about the third week in April, *when there had been torrential rain*. The hospital to which I referred was in a gully, and no doubt its experience with regard to flood was exceptional. The rain, besides overflowing the ground, penetrated the tents.”

Thus, then, it would appear that it was one hospital only—and that pitched in a sort of gully—which was affected, and that the rain had poured in torrents so heavy that even the tent itself could not keep it out. Yet such an incident, lasting perhaps a few hours, is put forward as if a fair illustration of what was going on in the Bloemfontein Hospitals.

THE late Sir George Burrows used to tell a good story of an old Duke of Portland, long ago dead. Sir George had been attending a lady in the Duke's household, but had never met his Grace. One morning a missive was given to him which ran: 'The Duke of Portland begs to hand to Sir George Burrows a prescription for dropsy which has long been in his family, thinking that it may be of use in Mrs.—'s case.' The reply was as follows: "Sir George Burrows begs to thank the Duke of Portland for the prescription he has so kindly sent; Mrs.— is, however, now well rid of her dropsy, but she still has organic disease of the heart, and if his Grace has a remedy which will cure her of that, Sir George will be thankful for the prescription." In like tone it might have been quite fair had Lord Lansdowne thanked Sir W. Foster for the remedy (his own supervision) which he had suggested would, had it been duly adopted, have prevented the over-crowding of the Bloemfontein hospitals. That evil had now, however, ceased to exist, but there remained the possibility that in future wars the enemy might break bridges, destroy railway lines, and in various other ways make it difficult to send up medical supplies. If Sir Walter knew of a panacea against such contingencies Lord Lansdowne might have admitted that he would be glad to be informed of it.

AN interesting article on *Tarsal Operations for Entropion and Trichiasis* by Major H. Herbert, I.M.S., Bombay, appeared in the *Ophthalmic Review* for July 1900.

WE have much pleasure in reproducing the telegram sent by Professor Blanchard in the name of the Section of Bacteriology of the Paris International Medical Congress to Major R. Ross, I.M.S. — "*Section de Bactériologie vous adresse chaleureuses félicitations pour découvertes sur paludisme.*"

SURGEON-GENERAL D. J. O'CALLAGHAN died on 12th August, aged eighty-five. He joined the H. E. I. Company's Service in 1842, and served in the Sikh War, in the China War of 1860, and at the siege of Delhi. He retired in 1872; one of his daughters married Sir Henry Irving.

THE trial scheme of abolishing native cooks in certain British Regiments is an experiment which will be followed with interest.

At the recent Centenary of the Royal College of Surgeons the Honorary Fellowship was conferred upon Col. K. McLeod, I.M.S., of Netley, and Colonel O'Connell Raye, I.M.S. These were the only honours for the Indian Medical Service. Apparently others would have been granted if the persons thus to be honoured had been able to be present. Otherwise there is no explaining the omission of the name of the Head of the Indian Medical Department. A correspondent tells us that the name of a comparatively junior but well-known Surgeon in the Punjab was mentioned, but the reply was, "only senior men will be honoured."

It is about time that rewards should be given for good professional work.

WE are indebted to Mr. James Cantillo, F.R.C.S., for reprints of the proceedings at the recent British Medical Association Meeting.

MAJOR F. P. MAYNARD, I.M.S., has been appointed to bring out a new edition of the well-known Moore's "Family Medicine in India."

WE note that a new edition of Notter, Frith and Horrock's "Hygiene" is announced. We wonder where Parkes' name comes in. The foundation, and more, of the book is still that of Edward Parkes.

THE *Indian Medical Gazette* was officially represented by Capt. W. D. Sutherland, I.M.S., at the recent Medical Press Congress and International Medical Congress in Paris.

LIEUT.-COL. L. A. WADDELL's book on "Among the Himalayas" has been most favourably received by the reviewers in its second and cheaper edition. It is usually compared to Hooker's "Himalayas."

THERAPEUTIC PREPARATIONS.

WE have already called attention to the extreme convenience of the "SOLOID" microscopic stains produced by Messrs. Burroughs, Wellcome & Co. They enable solutions to be prepared in small quantities as required. The following 'Soloids' are now ready:—Löffler's Alkaline Methylene Blue, Gentian Violet, Carbol Fuchsin (Ziehl's), Gram's Iodine Solution, Bismark Brown, Eosin, Methyl Violet. They only cost 5 pence per tube. The same firm have sent us specimens of Tabloids of "QUININE HYDROBROMIDE," which must be invaluable when large doses of quinine have to be given and cinchonism avoided. The same firm's ENULE suppositories are also becoming well known. The most recent are enules containing opium, which are most useful in many renal and uterine painful affections.

Notice.

SCIENTIFIC Articles and Notes of Interest to the Profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if requested.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., Calcutta.

Annual Subscriptions to the Indian Medical Gazette Rs. 12, including postage.

BOOKS, REPORTS, &c., RECEIVED.

The Goulstonian Lectures on Typhoid. (Churchill & Co.)
Contributions from Pepper Laboratory. (Philadelphia University Press.)

Swamy's Handbook of Eye Diseases. 7th Edition.
The Science of Life. By Dr. B. L. Dhingra. (*Pioneer Press.*)
The Sanitary Commissioner's Report, Bengal.
The Sanitary Commissioner's Report, Madras.
The Sanitary Commissioner's Report, N.-W. P. and Oudh.
The Sanitary Commissioner's Report, Punjab.
The Madras Dispensary Report.
The Madras Medical Institutions' Report.
Calcutta Health Officer's Report.
Punjab Dispensary Report.
The Bengal Chemical Examiner's Report.
Calcutta Medical Institutions' Report.
The Director-General's Annual Note on Jails.
Assam Dispensary Report.
Assam Vaccination Report.
Punjab Vaccination Report.
The Prevention, &c., of Cholera. By Col. J. Duke, I.M.S.

COMMUNICATIONS RECEIVED FROM:—

Capt. E. A. R. Newman, I.M.S., Calcutta; Capt. L. Rogers, I.M.S. Calcutta; Capt. Henry Smith, I.M.S., Jullundur; Lieut.-Col. J. Duke, I.M.S., Abbottabad; A. Neve, Esq., F.R.C.S., Kashmir; Capt. S. Thompson I.M.S., Missouri; Capt. J. A. McNaught, R.A.M.C., Deolali; Major A. M. Davies, R.A.M.C., Simla; Mr. H. Swanzy, F.R.C.S.I., Dublin; Major F. P. Maynard, I.R.V.S., London; Mr. J. Cantile, F.R.C.S., London; Major R. Ross, I.M.S., Liverpool; Capt. S. P. James, I.M.S., Calcutta; Capt. J. T. Calvert, I.M.S.; Major A. E. Roberts, I.M.S., Simla; Major Al, I.M.S., Simla; Capt. Lamb, I.M.S., Bombaray; Major D. Simson I.M.S., Madras; Major A.M.C., Murree; Major A. Buchanan, I.M.S., Nagpur; Capt. Sutherland, I.M.S., Frankfort-on-Maine.

Original Articles.

THE BIOLOGICAL TREATMENT OF SEWAGE.

By A. M. DAVIES, D.P.H.,

MAJOR, R.A.M.C., *Sinla.*

OF late years several methods have been brought forward by which it has been sought to dispose of sewage without, on the one hand, the production of a large amount of sludge, such as has been the result of the various precipitation processes; and, on the other, without incurring the necessity for the purchase of large areas of land, as in filtration and irrigation processes. The results of the two last named methods have been in many instances satisfactory; the sewage has been disposed of, a good effluent produced, and some return obtained by sale of crops, which has more or less reduced the recurrent expenditure on the sewage works. But in the case of large towns, it has often been a matter of great difficulty to obtain a sufficient area of suitable land within a practicable distance. Sometimes this has been an absolute impossibility with regard to precipitation processes, not only has the disposal of the sludge given great trouble, but in spite of innumerable trials, no precipitant has yet been found that has produced a really satisfactory effluent; an effluent, that is, that may safely be discharged into a small stream.

The various plans by which the vital action of bacteria has been brought into play, so as to convert the offensive and injurious constituents of sewage into inoffensive and harmless liquids and gases, may perhaps be conveniently considered somewhat in chronological order. The experiments of the Massachusetts State Board of Health began in 1887: those of the Manchester Sewage Commission took place in 1898 and 1899; while the Chemist to the London County Council is carrying on experiments at the present time. Dibdin's work at Barking and Sutton (from 1891 to present date); Scott Moncrieff's Ashtead experiments (1891 to date); and Cameron's Septic Tank System (1895 to date) will be briefly described in order; and some of the chief results of Laws, Andrewes' and Houston's observations on the Bacteria of Sewage and Effluents alluded to.

(1) The work of the Massachusetts State Board of Health at their Lawrence experimental station is perhaps the starting point of the modern biological treatment of sewage: these experiments were carried out from 1887 to 1893. Different filtering media (sand, gravel, peat, soil, &c.) were tested. "The experiments with gravel stones give us the best illustration of the essential character of intermittent filtration of sewage. In these, without straining the sewage sufficiently to remove even the coarser suspended particles, the slow movement of the liquid in thin films over the surface

of the stones, with air in contact, caused to be removed for some months 97 per cent. of the organic nitrogenous matter, a large part of which was in solution, as well as 99 per cent. of the bacteria, which were of course in suspension, and enabled these organic matters to be oxidised or burned, so that there remained in the effluent, but 3 per cent. of the decomposable organic matter in the sewage, the remainder being converted into harmless mineral matter. The mechanical separation of any part of the sewage by straining through sand is but an incident which under some conditions favourably modifies the result; but the essential conditions are very slow motion of very thin films of liquid over the surface of particles having spaces between them sufficient to allow air to be continually in contact with the films of liquid. With these conditions, it is essential that certain bacteria should be present to aid in the process of nitrification.

These, we have found, come in the sewage at all times of the year; and the conditions just mentioned appear to be most favourable for their efficient action, and at the same time most destructive to them and to all kinds of bacteria that are in the sewage. The result of experiments as to the effect on filtration of exclusion of air, i.e., by continuous instead of intermittent filtration, was that no nitrification takes place, and the effluent gradually becomes worse until it contains as much organic matter as the sewage" *Report for 1890.*

(2) These Lawrence experiments were with dilute sewage. Between 1891 and 1895 a long series of trials were made at Barking, under the superintendence of Mr. W. J. Dibdin, Chemist to the London County Council, on London Sewage that had been previously precipitated by limewater and ferrous sulphate. At first various filtering substances were tried on a small scale; burnt ballast, Lowestoft Shingle (pea size), coke breeze (pan waste), sand and gravel, sand gravel and polarite. All these substances purified to a considerable extent, "the desiderata evidently being porosity and consequently power of re-absorbing atmospheric oxygen." Coke breeze gave best results on the whole. It was found that micro-organisms were generally present in the filtrate in larger numbers than in the effluent ("after precipitation, but before filtration"); but it soon became apparent that the presence of comparatively fewer or more microbes afforded no idea of the purification effected, the main point being that the presence of a large number of organisms was evidence of the activity of the process of splitting up the organic compounds in the sewage matters passing through the filters."—*Dibdin*

A more extended trial was then (1893) made with a filter, one acre in extent, composed of coke (or pan) breeze, 3 ft. in depth, covered with 3 in. of gravel to keep the coke from floating. The sewage effluent (after lime and iron precipitation) was poured on to this to the extent of one million gallons daily, it speedily became clogged, the quantity that passed through diminished, and at the end of 12 weeks it was putrid throughout and quite useless. This showed that rest and aëration were necessary, and that the quantity poured on must be increased very gradually so as to get proper biological conditions. The surface was raked over, and the bed allowed to rest for 3½ months, when it became perfectly sweet. Then (April, 1894) small quantities of effluent were added, the filter being filled and emptied twice daily: after a month's working, the quantity passed through was about 500,000 gallons daily, the purification (measured by oxygen absorbed) was 83 per cent., and fish lived in the filtrate. The quantity was increased until 1,000,000 gallons were passed through daily, or rather 1½ million for six days, the filter resting from 10-0 P.M. on Saturdays until 6-0 A.M. on Mondays. The method was to fill during two hours, to allow to stand full one hour, and to empty during five hours, completing a cycle in eight hours. The purification effected was 78 per cent. During the severe winter of January-February, 1895, the filter acted well, though thin ice

formed on the surface. From November 1894 to March 1895 the average reduction of oxygen absorbed in four hours was from 4.113 grs. per gallon (in effluent) to 0.935 in filtrate; the albuminoid ammonia was reduced from 0.382 grs. per gallon to 0.114; the average nitrogen as nitrates was increased from 0.3956 gra. per gallon to 0.6990. "The experiments, taken as a whole, show that sewage, especially if previously clarified by precipitation, may be purified to any desired degree, the actual amount of purification depending upon (1) the length of time during which the effluent is allowed to remain in contact with the filter, and (2) the length of time allowed for aëration."—*Dibdin*. In 1898, the depth of the bed was increased to six feet, the purifying action is stated by Dr. Frank Clowes, the present Chemist to the London County Council (June, 1900) to be 84 per cent. (oxygen absorption).

(3) These Barking experiments were with sewage that had been previously clarified by precipitation. In 1896 Dibdin began to treat crude sewage (simply strained through a screen to intercept the grosser particles) at Sutton, by first passing it through a "bacteria-tank" of coarse burnt ballast ($3\frac{1}{2}$ feet deep), and then leading the effluent from this tank through a coke-breeze filter. The sewerage of Sutton is on the "separate" system, rainfall being excluded. The ballast tank was first inoculated with bacteria. These beds have been working successfully; the coarse bed taking 100 gallons, and the fine coke bed 150 gallons per sq. yd. per day: the ballast tanks fill for $\frac{3}{4}$ hour, rest full two hours, empty $1\frac{1}{2}$ hour, and rest empty two hours: two or sometimes three cycles are completed in the day. After seven months' working the average reduction in suspended matter was from sixty grs. per gallon in the crude sewage to 2.78 in the tank effluent and 0.725 in the final filtrate; the oxygen absorbed in four hours was reduced from 4.543 grs. in sewage to 1.674 in effluent and 0.644 in filtrate; the alb. ammonia fell from 0.792 to 0.329 in effluent, and 0.170 in filtrate. The purification (reckoned by oxygen absorbed) effected by the combined beds was 85.83 per cent. An automatic rotary screen intercepts the coarser matter before reaching the bacteria tank.

Dibdin states (1900) that there is no loss in the water-capacity of the fine beds, but the coarse beds have been reduced by from 12 to 20 per cent. If granite or slate be used for the coarse beds, the effluent is not so good, but sludge is altogether removed, and the water-capacity is far greater; also the effluent is readily purified in the fine bed. The size of medium recommended for the coarse beds is from $\frac{1}{2}$ in. to 2 in., and for the fine beds between $\frac{1}{8}$ and $\frac{1}{4}$ or $\frac{3}{8}$ in. This system has been tried at Oswestry, and at Leeds, where some difficulty was experienced from "sludging up" of the beds: Finer screens were then used and the periods of rest lengthened.

(4) At the Metropolitan Southern Sewage outfall at Crossness, Dr. Frank Clowes has constructed bacteria beds containing coke in large sized fragments, about as big as walnuts,

thus increasing the sewage capacity of the bed, Facilitating rapidity of drainage, and promoting efficient aëration, the depth has been increased from 4 to 13 ft., the aëration even in the deepest part being well maintained. The sewage remains three hours in the tanks, add then flows out slowly; the coke beds rest empty for about seven hours, after which the process is repeated. Raw sewage, coarsely screened, has been found to lose practically all its suspended matter, this undergoing liquefaction and not remaining adherent to the coke surfaces. Purification has reached nearly 70 per cent., and the effluent from this bed has undergone an additional 20 per cent. of purification by being passed through a second similar bed. The effluent from even a single bed is clear and odourless, and fish live in it. It was found that the coke beds tended to become choked with sand and grit, cellulose, &c., deposited on the coke surfaces: this has been prevented by a preliminary rapid sedimentation, obtained by passing the sewage over partitions in the inlet channel. The effluent contains bacteria and spores of the same kind, but not so numerous, as in the crude sewage; such an effluent may be passed into the Thames estuary without objection (Clowes, 1900).

(5) As far back as 1891 Mr. Scott Moncrieff at Ashstead began to construct a bacterial tank, in which crude sewage was passed from below upwards over the surfaces of a bed of stones. He found the solids were effectually liquefied; but the tank effluent was easily decomposable, very little nitrification having taken place. Moncrieff then doubled the tanks, using them alternately with periods of rest and aëration, in order to get an oxidised effluent, and afterwards tried to obtain this result by passing it along "nitrifying channels" filled with coke. The right organisms, however, were not developed, as the effluent was freely exposed to the light. Finally, he has devised a series of "nitrifying trays," through which the effluent passes, one after another, with ample aëration: in this way the different organisms choose their own conditions, and in the final effluent a higher degree of nitrification is attained than in any other process. In the experimental installation at Ashstead, on a small scale, there are nine perforated trays, each one foot square, filled with 7 inches of coke, and 3 inches apart: the liquid passes through all the trays in 8 to 10 minutes. After continuous working for three months, analysis by Rideal of the effluent from the bottom tray showed 93 per cent. of purification, measured by the oxygen consumed. Rideal points out that in ordinary bacteria beds the different reactions are somewhat fortuitously reversed and confused, according to the periods of filling or rest, all the different bacteria being mixed together in one or two large filters: it seems more rational therefore to use smaller

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separate areas, as in the Scott Moncrieff System.

(6) The most complete separation into two distinct stages of purification is made in the next method to be mentioned. The *Septic Tank System* was introduced at Exeter in 1895 by Mr. Donald Cameron, the installation being for the treatment of the sewage of St. Leonards, a suburb containing about 2,000 inhabitants: the system consists of a closed tank, which receives the sewage from the sewers and a series of filter beds. The tank is of masonry below the level of the ground, and absolutely without light or air: it is 64 ft. by 18 ft., and 9 ft. deep, and contains about 54,000 gallons, or about the average daily dry-weather flow of the sewage treated. The sewage first passes through a grit chamber, in which is deposited sand and gravel from the roads, and then enters the tank without screening or treatment of any kind: the inlets are well below the surface of the fluid. An inspection chamber allows observation of the processes that take place. A leathery scum forms on the surface, from 2 to 6 inches thick; below this is the zone of fermentation, in which the sewage is clear, but permeated by bubbles of gas that constantly keep rising and maintain a quiet movement throughout the whole body of fluid; at the bottom is a layer of peaty material, very small in amount: small masses of organic matter are seen to fall from the top layer by their own weight, but on reaching the bottom gas is evolved from their constituents by bacterial agency and the particles are floated up again, on reaching the top the gas bubbles burst and the solid matter again sinks. This cycle is repeated until practically the whole of the suspended solid matter is liquefied through bacterial action. This action is entirely and essentially anaërobic. In order to prevent disturbance of the thick layer on the surface, which keeps out the air, both inlets and outlets are placed well below this. The flow through the tank is continuous; as its capacity is about that of the average daily flow, the average sojourn of the sewage in the tank is 24 hours, the rate of flow being about 2 feet per hour; in summer it remains for about 38 hours; in winter during floods for a minimum of about 10 hours. On starting a septic tank, it is necessary to introduce the sewage gradually and allow it to remain therein several days (about a week or more), in order to cultivate the bacteria that perform the anaërobic processes. The effluent leaves the tank by a slotted pipe, about a foot below the surface of the liquid, falls in a thin stream over an aerating weir, and is then distributed over four filters by an automatic arrangement, which regulates the cycle of filling, resting full, emptying, and resting empty for aëration. The filters are 36×20 feet, filled with $4\frac{1}{2}$ feet crushed furnace clinker ($1\frac{1}{2}$ in.) resting on 6-in. coarse gravel. The filter effluent or filtrate

is clear and runs into the river Exe without doing harm. Cartwright Wood incubated the filtrate for eleven days, and then injected it into guinea-pigs without producing any bad effect.

Dibdin and Thudichum found the average oxygen absorbed in four hours was reduced from 2.028 grs. per gallon in the crude sewage to 1.405 in tank effluent (purification, 30.8 per cent.) and 0.388 in filtrate (80.9 per cent. of purification): the albuminoid ammonia was similarly reduced from 0.212 to 0.175 and 0.078, giving percentage purifications of 17.5 and 63.2 respectively: other observers have found a total purification of 78 to 90 per cent. measured by oxygen consumed, and 64 to 84 per cent. measured by albuminoid ammonia.

In this process the action of the anaërobic organisms is encouraged by the special construction of the tank, and carefully differentiated from the subsequent aërobic action due to other organisms in the filters. The anaërobic action by which solids are liquefied may be compared with the liquefaction, *i.e.*, digestion or peptonisation of gelatine by bacteria: the *suspended* matter is diminished, the *dissolved* matter is somewhat increased: the hydrolytic decomposition has broken up (1) cellulose (paper, &c.) with evolution of marsh gas, and (2) complex organic matter with evolution of NH_3 , H_2 , CO_2 , &c.: a considerable quantity of inflammable gas is given off which is made use of for lighting purposes. It is clear that the sludge difficulty is successfully got over by this process at Exeter, the amount of solid matter that remains unaffected by bacterial action being very small. It has been said that the Exeter sewage is weak (the district of St. Leonards consisting only of residential houses with an ample water-supply), and that therefore the plan would not be applicable in ordinary cases. It has, however, been tried at Yeovil, where there is a very offensive sewage from fellmongers and dye works, and apparently with success. The Local Government Board sanctioned (1897) the extension of the process for the whole city of Exeter, with the usual proviso as to passing the filter effluent on land.

In the most recent experiments at Leicester (1899) by Mr. Mawbey, it has been found that, although the effluent from a closed septic tank showed large reductions of oxygen absorbed and albuminoid ammonia, the effluent from a bacteria bed alone, without any previous septic treatment, was practically just as good; the tank effluent was offensive, and a very large amount of offensive sludge was deposited in the tank. These results are quite contrary to those previously obtained at Exeter and Manchester. It has been suggested that at Leicester the sewage has undergone excessive anaërobic action in the sewers before reaching the tank, from faulty condition of sewers leading to

delayed flow: this explanation seems reasonable, and requires to be taken into consideration: it is, however, not an argument against the efficiency of the septic process so much as a condemnation of the system of sewerage.

(7) For many years past the city of *Manchester* has been in difficulties as to its sewage disposal: not only has a population of more than half a million to be provided for, but the character of the sewage (largely composed of manufacturing refuse) has made chemical processes of treatment difficult and unsatisfactory, and for land treatment neither the area necessary nor any suitable kind of soil are available. In June, 1898, Mr. Baldwin Latham, Prof. P. Frankland and Mr. W. H. Perkin, Jr., were appointed to experiment and report on the whole question: their report is dated 30th October 1899. At the outset it appeared that it was in the direction of bacterial treatment that lay the greatest likelihood of success. The commissioners set themselves to determine (1) whether the trade refuse of Manchester seriously impaired the efficiency of this method; (2) whether a portion at any rate of the sludge could be got rid of; (3) whether previous addition of chemicals could be dispensed with; (4) whether the aerobic process, or a combination of aerobic and an aerobic processes would be best. Bacteria beds were constructed, and a septic tank installation with its accompanying filter beds.

The bacteria beds were filled to a depth of three feet with clinker of varying size in the four different beds. It was arranged that they could be worked either with (1) raw sewage, screened only through a grid; (2) sewage that had settled in a small settling tank; or (3) sewage from a large precipitation tank which had undergone settlement and anaerobic action. At first, settled sewage was treated on two beds, A and B, one after the other (double contact), containing three feet of clinker, in A from three inches to one inch, and in B from one inch to quarter inch in size; each bed was filled twice daily, and rested full from one to two hours. It was found that the beds acquired a high degree of efficiency, and after a month three fillings daily were tried. This being found satisfactory, raw sewage was admitted once daily, the other two fillings being with settled sewage. Then raw sewage was run on three times daily. Finally, four fillings of raw sewage were tried, after a week, however, the first bed (A) showed signs of clogging, and then settled only was used. As a good deal of suspended matter had been carried through the small settling tank on to the first contact bed, a sunk partition was placed to prevent this as much as possible.

The septic tank installation was on the same plan as that at Exeter (see above, 6): the filter beds had a depth of four feet of clinker, at bottom one foot of three inch to one inch size, then two feet nine inch of $\frac{3}{4}$ inch to $\frac{1}{2}$ inch size, and at top three inches of residue that passes $\frac{1}{2}$ inch mesh.

In February, 1899, a modification was made: raw sewage was allowed to flow steadily through a large precipitation tank, and this continued without intermission until the date of the report in October. The contents of the tank soon became black, bubbles of gas began to rise, with masses of sludge from the bottom, which formed a scum covering the surface. It was found that no sludge accumulated at the bottom of the tank, except just beneath the inlet. The effluent from this "open septic tank" was similar to, but rather better than, that from the closed septic tank. At the end of April this effluent was led on to the bacteria beds A and B previously mentioned, but the result was not satisfactory. On 1st June it was treated on two other beds, C and D, which since 13th April had had two fillings per day: C bed was filled (3 feet) with clinker, $\frac{3}{4}$ inch to $\frac{1}{2}$ inch, and D with $\frac{1}{2}$ inch to $\frac{1}{4}$ inch in size. Eventually the results were so good that with four fillings a day every

sample was non-putrescible and well within the standard limit of impurity. This system is the "open septic tank with double contact bacteria beds."

The standard limit of impurity for effluents (into the ship canal) had been laid down by the Mersey and Irwell Joint Committee as one grain per gallon oxygen absorbed in four hours (=1.43 parts per 100,000: the temperature is not stated, presumably it was 80° F, and 0.1 grain per gallon albuminoid ammonia (=0.143 parts per 100,000). A further test for putrescibility was employed called the "incubator test." The oxygen absorbed in three minutes having been determined in the affluent, a bottle is filled with it, closed, and incubated at 80° F. for six or seven days: the oxygen absorption in three minutes is again determined. If putrefaction has occurred, more oxygen will be required; while if oxidation has taken place at the expense of the nitrates or dissolved air, slightly less oxygen will be required; or the absorption may be unaltered. If nitrates exist in large quantity in an effluent it indicates that the organic matter has been well oxidised; such an effluent may have a beneficial action in a stream owing to oxygen being liberated from the nitrates by bacterial action. Chlorine is unaffected by bacterial processes, its quantity will show if the product of the purification process is strictly comparable with the original sewage.

In the first experiments with bacteria beds, A and B, it was found that the standard both as regards oxygen absorbed and albuminoid ammonia was generally attained, and the incubator test was generally satisfactory. The filter effluent from the septic tank process was very satisfactory by the incubator test, but frequently exceeded the standard both of oxygen and albuminoid ammonia. The following table shows the results of the later experiments with the "open septic tank," compared with those of the closed, or ordinary septic tank: the figures are the average of the weekly averages from 12th July to 13th September 1899, in grains per gallon.

	Open septic tank effluent.	Filtrate from D bed (second contact.)	Closed septic tank effluent.	Filtrate from beds of septic system.
Oxygen absorbed in 4 hours	4.90	0.48	5.84	1.16
Free ammonia ...	2.25	0.36	2.61	1.16
Albuminoid ammonia	0.22	0.045	0.30	0.109
N H ₃ from Nitrites	Nil	0.048	Nil	0.05
N H ₃ from N O ₂ and N O ₃	...	0.74	...	0.37
Incubator test:				
Oxygen absorbed before	2.92	0.24	3.73	0.54
Oxygen absorbed after ...	...	0.19	...	0.47
Chlorine ...	11.5	11.0	12.3	12.0

Subsequently it was found that by mixing effluent from the first bed (C) with that from D, in equal proportions, a liquid was obtained which withstood the incubator test, and did not putrefy; thus showing that the bed area might be reduced.

Other points determined in these experiments were (1) with regard to the filter beds, that suspended matter should be previously removed as far as possible, by sedimentation; that any

such matters not removed should be retained on the surface of the bed; that to maintain efficiency, the surface must be raked occasionally; and that periodic intervals of rest must be allowed. (2) With regard to *Storm waters*, there is a greater amount of impurity in the first flow than in ordinary sewage; therefore provision must be made for storage of the first flush, and its full treatment as if it were sewage: about two hours after the augmented flow has reached the works, it may be considered to be storm-water proper, the sewage being much diluted: accelerated treatment may now be commenced, either by short double contacts, or even by single contacts.

The recommendations made were chiefly that the sewage, after screening, should pass through open septic tanks, provided with submerged walls and floating scum-boards; if necessary, "roughing tanks" should be used to get rid of suspended matters as much as possible, that the effluent so cleared should pass through double contact beds, about 60 acres for a dry weather flow of 30 million gallons, at the rate of half a million gallons, per acre, with four fillings in the 24 hours; the beds being laid out in pairs, high level and low level, of half an acre each, and 3.33 feet in depth; filled with clinker between $1\frac{1}{2}$ inch and $\frac{1}{8}$ inch in size: storm waters to be dealt with similarly, and a special bed area of 25 acres provided for the purpose.* The Commissioners confidently expressed the opinion that the bacterial method would be competent to deal quite satisfactorily with the sewage of Manchester, in spite of the presence of the large quantity of manufacturing refuse.

(8) From September 2nd, 1898, to October 13th, 1899, a series of experiments was carried out at Leicester by Mr. Mawbey, the report on which has lately been published. Different processes were tried with the result that passing the sewage through a detritus tank, then through a coarse bacteria bed ($4\frac{1}{2}$ feet deep), then through pasture land, produced the most satisfactory purification. The suspended matter was reduced from 43.7 grains per gallon in the crude sewage to 0.385 in the final effluent; the oxygen absorbed in four hours at 80°F., from 7.41 to 0.66; the albuminoid ammonia from 1.18 to 0.156; the percentage purifications being 99.12, 86.76 and 91.08 respectively: no anaërobic treatment was applied.

In experiments with a septic tank, the effluent from this was found to be very foul, and a very large quantity of foul sludge was deposited. These results (as regards the anaërobic part of the treatment) are contrary to those of previous experience: it has been suggested that anaërobic action takes place in the sewers. Whether or no septic treatment be suitable for the Leicester sewage, there seems no doubt that the bacterial purification process acts most successfully in this instance, and that land irrigation over old pasture and eye

grass (which is here available to the extent of 1,355 acres) aids in bringing about its efficiency.

(9) The *Lowcock* filter consists of layers of sand, pea and bean gravel and pebbles: the sand is at the top, one layer of pebbles at the bottom, and another layer in the middle: the sewage is run evenly over the top layer and gradually percolates downwards: in the middle layer of pebbles are fixed perforated pipes, through which air is forcibly blown into the filter from the sides, thus causing very free aëration. The *Waring* filter is a more complex arrangement, in which the sewage, after having been settled, is passed into an "aërating tank" filled with stones and gravel, in which air is constantly driven through the mass. In the *Ducat* filter (which deals with crude sewage) the sides are constructed of ordinary drain pipes, so placed that the outer ends are higher than the inner ones: at certain levels layers of drain pipes go through the whole of the filter: the depth of the filter is eight feet: the sewage is applied continuously in a trickle.

The *Garfield* coal filter has given very good results at Wolverhampton, Lichfield and elsewhere: the filter is five feet in depth; at the bottom are three inch of coal (one inch cubes), covered with $\frac{1}{2}$ inch cubes for another three inch, then two feet of fragments $\frac{3}{4}$ inch to $\frac{1}{2}$ inch, then two feet of fragments $\frac{1}{2}$ " to $\frac{1}{8}$ ", all washed free from dust; the top layer is made up of the dust, so as to distribute the sewage evenly over all: it is applied continuously by iron troughs or pipes which constantly overflow.

(10) *Micro-organisms of sewage*.—Jordan has investigated the organisms in the sewage of Lawrence, Massachusetts; Parry, Laws and Andrews those of London sewage (1895): the former observer found an average of 708,000 bacteria per c.c.; the latter much larger numbers, ranging from about 2½ million to about 6½ million per c.c.; but these figures are only a rough approximation. Moulds were very rarely present; *B. Coli* was found almost invariably and in great numbers; also bacilli almost identical with it; sarcinæ were very numerous; bacilli were more numerous than micrococci: the commonest organisms were *B. fluorescens stercoralis*, *B. f. liquefaciens*, *B. albus putidus*, *B. cloacæ fluorescens*, *B. mycoides*, *Proteus cloacinus*, *P. Zenkeri*, a streptococcus coagulating milk, *Staphylococcus pyogenes citreus*, *Sarcina flava* and its allies, *Diplococcus ulbicans tardissimus*, and others. The diphtheria bacillus was not found; neither was *B. typhi*, even in a drain receiving the sewage of the Homerton Fever Hospital at a distance of about $\frac{1}{4}$ mile below its inflow. When taken from a manhole before entering the main sewer, and when there were 40 cases of enteric fever under treatment, the stools having been passed into the drain without disinfection (by special arrangement) for two days previously, the sewage was found to contain bacilli indistinguishable from *B. typhi*: from one c.c. of a 1 in 5000 dilution two colonies were isolated.

Experiments were made on vitality of the bacillus in sewage: in sewage sterilised by heat and incubated at 37° C. death occurred in about three days (*B. coli* growing and multiplying abundantly under these conditions): when kept at 20° C. *B. typhi* lived much longer, nearly a fortnight: when grown in sterilised sewage to which cultures of sewage organisms were added (*B. fluorescens stercoralis*, *liquefaciens* and cloacal *B. albus putidus*) separately, and all together, *B. typhi* remained alive for seven days and perhaps longer, though in greatly diminished numbers.

"This degree of resistance may be sufficient to allow of their being carried in sewage to remote distances, and of their being able to produce disastrous results should they gain access to any water-supply." Laws and Andrews concluded "that sewage is a common medium for the dissemination of typhoid is certain,

* The Local Government Board at present require that two volumes of storm water plus the normal sewage must be treated as sewage-proper, while an additional three volumes must be treated either by a special filter or special area of land: six times the normal dry weather flow therefore has to be provided for.

that sewage-polluted soil may give up germs to subsoil air is possible; but that the air of sewers themselves should play any part in the conveyance of typhoid fever appears to us, as the result of our investigations, in the highest degree unlikely"—*Report to London County Council, 1895.*

Houston has more recently (1898-9) studied the forms found at the main drainage outfalls. The average number of bacteria (aërobic) at Barking was nearly 4,000,000 and at Crossness 3,500,000 per c.c.; the number of spores was 332 and 365 per c.c. respectively; the liquefying bacteria varied from 220,000 to 900,000 per c.c. *B. Coli* and its allies were found in great numbers; *B. enteritidis sporogenes* was also present in such numbers as to be easily detected; the other commonest forms were *B. Subtilis*, *Mycoides*, *Mesentericus* and *Proteus*. In the deposit upon the Barking Coke beds, the number of bacteria present (reacting to the usual aniline stains) was not so large as might be expected, 1,800,000 per gramme of deposit: *B. enteritidis sporogenes* was found in spore form, *coli*, *Proteus mirabilis*, *B. arborescens*, and *B. prodigiosus*; also apparently the bacillus of tetanus, and a large number resembling closely the tubercle bacillus ("acid-fast" reaction, retaining carbol-fuchsin after treatment with 33 per cent. nitric acid): in one instance a guinea-pig inoculated with the deposit from a bacterial bed died with signs of tuberculosis, and tubercle bacilli were found in the organs. These same "acid-fast" bacilli were found in the effluent from the bacterial beds.

The question of the presence of *pathogenic bacteria* in a tank effluent or filter effluent is of course a very important one. *B. ent. sporogenes* survives the septic treatment (Rideal). Dr. Pickard introduced an emulsion of *B. typhi* into a septic tank and found that they rapidly diminished, less than one per cent surviving after fourteen days; sewage was inoculated with *B. typhi* and passed through the bacterial filter of the Exeter process; about 10 per cent. were found in the filtrate; ordinary tank effluent was then passed through this filter; the filtrate only contained about one per. cent.; showing that they did not multiply in the filter. Houston has shown that the Ducat filter removes 90 per cent. of the spores of *B. ent. sporogenes*. According to Rideal a filtrate may be sterilised chemically, if considered necessary by a "finisher"; 1.77 parts per 100,000 of available chlorine killing all micro-organisms.

(11). It is too soon yet to pronounce an opinion on the relative merits of the different bacterial processes shortly described in the preceding paragraphs. There seems, however to be no doubt that an effective sewage purification can be obtained by the agency of bacteria, that the sludge difficulty has been overcome, and that large areas of land are not necessary for sewage treatment (though they may be as effective when they are available): some method or combination of methods of bacterial treatment will apparently be the practice of the immediate future. It would seem that a separation of the first stage, that of anaërobic action, from the second stage, that of aërobic action, is a more rational procedure than allowing both processes to go on in the same tank or bed; that is, either the Exeter septic tank system, or the open septic tank system (as recommended at Manchester), or the Scott Moncrieff system, seems more scientific than the simple bacteria beds of the Sutton process. As between the first three mentioned, the Scott Moncrieff system does not

seem to have been tried on a large scale; the open septic tank system seems to fulfil all reasonable requirements as regards effluent, but it can hardly be advisable to have such sewage works on a large scale anywhere near inhabited places; the Exeter system appears to be absolutely free from offensiveness, and the works might be situated anywhere.

The actual changes that take place in the sewage are not as yet certainly determined: Dr. Rideal divides them into an initial transient aërobic action by the oxygen of the water that carries the sewage (dealing with urea, ammonia, and the easily decomposable matters), followed by three stages: in the first stage, that of anaërobic liquefaction and preparation by hydrolysis, albuminous matters, cellulose and fats are broken up, the products being soluble nitrogenous compounds, fatty acids, phenol derivatives, gases and ammonia; in the second stage, that of semi-anaërobic breaking-down of the intermediate dissolved bodies, amido-compounds, fatty acids, &c., are dealt with, with formation of ammonia, nitrites and gases; in the third stage, that of complete aëration and nitrification, ammonia and carbonaceous residues are changed into CO_2 , H_2O and nitrates. To produce nitrification (1) some fixed base must be present to combine with the acid formed; ordinary sewage is alkaline (from soda), but manufacturing sewage may require addition of lime; (2) there must be free aëration, but not exposure to sunlight.

As to a standard of purity for effluents, no agreement has yet been arrived at: the Mersey and Irwell Joint Committee have fixed on one grain per gallon oxygen absorbed in four hours at 80° and 0.1 grain per gallon albuminoid ammonia. The British Association Committee recommend that results should be stated in parts per 100,000 (grains per gallon $\div 0.7 =$ parts per 100,000). Dr. Barwise suggests as limits 1.5 and 0.15 per four-hour oxygen and albuminoid ammonia, three for suspended matters, and not less than 0.25 nitrogen as nitrates, all in parts per 100,000. The Manchester "incubator" test is a good one; but it is most desirable that some biological test should be devised for all effluents passing into streams that may be used for water-supplies: a sterile effluent cannot be hoped for, but at least it should not contain large numbers of *B. coli* and *B. enteritidis sporogenes*, or even *B. tuberculosis*. Dr. Houston has shown that in the Crossness experiments *bacillus coli* and spores of *B. enteritidis sporogenes* are present in the effluent in as large numbers (nearly) as in the crude sewage; he also considers that the cholera vibrio can survive for some days, perhaps weeks, in crude sewage; it may therefore probably also be able to traverse a bacterial filter. Evidently the last word has not been said as to the safe disposal of sewage that may contain the germs of specific disease.

ON THE CAUSE OF BOILS AND CARBUNCLES AND SOME POINTS IN THEIR TREATMENT.

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BOILS and carbuncles seem more frequent in India than in temperate climates and cause a considerable amount of suffering. The following observations on their cause and treatment are given with the hope that they may be useful to others. Much has been written in the textbooks on their cause, but few of them seem to lay stress, and some do not even mention the fact that local inoculation by a "micro-organism" is probably the chief factor in the disease. Predisposing causes receive much attention, and they no doubt have a great influence; but it is probable that no boil ever commences without inoculation by a definite specific micro-organism. If this fact were more generally appreciated certain lines of treatment, generally adopted in combating a living virus, would be more definitely insisted on.

The following observations which were made in a recent epidemic of boils in this station seem to support the microbial inoculation theory:—

(1) That boils may assume a distinctly epidemic character. In this station many persons, both European and Native, were attacked with boils within a few days of one another. This outbreak was coincident with the first few showers of rain which ended the dry hot weather.

(2) That the disease is contagious from one member of a household to another. Especially with children, if one child gets a boil, it is often the case that his playmates are infected.

(3) If an individual become affected with a boil, fresh points of local inoculations occur in the neighbourhood of that boil. If one buttock is attacked, the contiguous buttock is also frequently attacked. This occurs especially if poultices have been used or dressings have in any way spread the discharge. A "crop of boils" is due to inoculation at several points near the original boil.

(4) That a house may probably become infected by a micro-organism. There are two houses in this station where the inhabitants constantly suffer from boils. In one of these, three successive tenants have been attacked. The tenants of 1897 and 1898 suffered badly. The house was vacant in 1899. The new tenant of 1900 has had two carbuncles and several boils. Either the house must have very bad general sanitary conditions producing ill-health (which are not, however, apparent), or it is possible that it may be infected with the specific micro-organism which produces boils.

(5) The commonest parts of the body affected are those most likely to be attacked by a micro-organism. These are the back of the neck, the hands, the buttocks and the axilla. The first three of these localities are directly exposed to the air and where germs would readily alight. The buttocks and the arm-pits are where the sweat, dirt, and debris of the animal economy readily collect, and with the friction of the clothing would be good sites for the development of any germ.

(6) Judging from the many cases I saw, there seemed to me to be a definite relationship between a prolonged attack of boils and insanitary conditions, either of the house or person; and that, given the predisposing cause of bad health, infected clothing (more especially underclothing and pillow cases) bore a prominent part in prolonging the attack.

(7) The inflammation attending a boil or carbuncle has a very definite character of its own—a chronic angry purplish red inflammation. Compare with it the inflammatory conditions of malignant pustule, cancerum oris, erysipelas and whitlow from septic infection. All are due to local inoculation with a specific germ; all have very different definite characters. The two first are not unlike the inflammatory condition of boils. It does not seem unreasonable to think that the definite character of the inflammation in a boil should be due to a definite specific micro-organism also.

The actual proof, according to Koch's canons, of a definite specific microbe has not yet been established. Most of the pyogenic bacteria are present. Hutchinson* says more especially the *Bacillus Staphylococcus pyogenes aureus*. This bacillus from a case of osteomyelitis rubbed into the skin of the arm caused a crop of boils, but this bacillus does not always produce boils. It is found in all suppurative processes, more especially in acute abscesses. "When brought on the surface of a wound, it produces progressive suppuration; when subcutaneously injected it produces an abscess.†" How then is it the cause of boils. It is said to produce them occasionally on account of the dense nature of the skin. If this is the case, how is it that the diffuse inflammation of whitlow is so much more common than boils, in the exceptionally thick skin of the fingers. *Staphylococcus pyogenes aureus* is abundantly with us, more especially on the skin.‡ If it was the cause of boils, surely they would be more abundantly met with than they are. A long bacillus, hitherto unnamed, has occasionally been found in boils similar to that found in cancerum oris.§ This bacillus may possibly be the specific cause,

* Treves' System of Surgery, Vol. I, p. 711.

† Schenk, Bacteriology, p. 112.

‡ Sims Woodhead in Treves' Surgery, p. 25.

§ Hutchinson in Treves' Surgery, p. 712.

and may prove so when more attention has been given to it.

(8) In India there seem to be three special predisposing causes which may perhaps account for the prevalence of boils in the country. (1) The general debility which many men suffer from during the rains, due to poverty of blood and want of nervous tone, engendered by long hours of work in a hot climate. (2) The sodden and over-worked condition of the skin from perpetual perspiration; the skin in this condition would have less resistance to a micro-organism. (3) The many abrasions which result from the efforts to relieve prickly heat. I have seen two or three cases of boils arise in irritable spots of prickly heat. There seems to be no evidence to support the popular theory that mangoes, lime juice, excessive meat diet and errors in diet are the cause of boils.

Some points in Treatment.—Bearing in mind the fact that the disease is probably due to a micro-organism, the following points in treatment not generally noticed, may with advantage be considered:—

(1) Pay scrupulous attention to personal cleanliness of the patient. Insist, as far as possible, on frequent changes of soiled linen. Pillow cases may easily become infected when boils are in the neck, and may thus be the source of a crop of boils.

(2) When the boil first appears have the locality thoroughly shaved, then well washed with carbolic lotion, then dried and covered with a soft antiseptic pad. Bathe also with antiseptic lotion night and morning. These measures will tend to check the spread of boils in the neighbourhood.

(3) In a household of children, if one gets a boil it is advisable to isolate him as far as possible from the other children till his boil is cured.

(4) In a case of boils tell the patient to avoid washing the skin with irritable soaps and do all you can to allay the irritable condition of prickly heat, which is in one way a predisposing cause.

(5) When suppuration is established, the discharge should be received on to absorbent antiseptic dressings. The patient should be cautioned *not to squeeze the boil himself* and receive the discharge on to a handkerchief or any piece of linen which then becomes infected and is often left lying about.

(6) Spraying the boil with carbolic lotion (1 in 40) twice a day for 10 to 15 minutes as recommended by Whitla* will do much good; also small plugs of lint saturated with pure carbolic thrust into the mouths of a carbuncle seem to accelerate suppuration and to allay irritation.

(7) I have found free incision across a tense boil give considerable relief, but most will agree with Sir J. Paget* that incision of a carbuncle has nothing to recommend it. Mr. Ruston Parker's treatment of excision† and scraping in some cases of carbuncle seems to have much to recommend it. It is somewhat similar to the surgical treatment of malignant pustule. Under chloroform there is excision of the walls and free scraping out of the slough, and then the application of pure carbolic acid to the base. The cases in which this treatment is suitable are those cases of indolent chronic carbuncles with much pain and fever, and which, in old men especially, are a source of danger to life. Mr. Ruston Parker has treated sixteen such cases with the best result; not only is much relief given, but the case is quickly cured, and in some cases life has been saved.

THE TREATMENT OF NIGHT-BLINDNESS BY INGESTION OF LIVER.

By W. J. BUCHANAN, M.B., D.P.H.,

MAJOR, I.M.S.,

Superintendent, Central Jail, Bhagalpur.

The readers of this *Gazette* may remember that attention was called in June to the extract made by Major F. P. Maynard, I.M.S., in our Current Literature Columns (June, p. 234) on the treatment of cases of night-blindness by ingestion of liver. The case in favour of the liver treatment seemed so clear that I determined to try it on the first opportunity, and the following cases are here published in order to call attention to this simple means of treating an unpleasant and sometimes serious complaint, which is certainly common in India.

CASE 1.—Rupa Rai, in Dumkha Jail for 7 months, in Bhagalpur Central Jail for 3 months. Had been in indifferent health and had much fever, but recently had improved and gained weight from 98 to 115 lb. since arrival in Bhagalpur; his spleen was not enlarged, he had no anaemia, and no spongy gums. He was in due course made a night watchman, and it was because he could not see his way about at night that he was sent to hospital by the jailor. The evidence as to the genuineness of the night-blindness was carefully inquired into, and tested without his knowledge. He states that the night-blindness came on within the past two months, certainly since the rainy season began, but it was not till he became a watchman that he troubled about it. It had also, he said, become worse. An examination of his eyes revealed no retinal changes, but xerosis of the conjunctivæ and deeply pigmented patches are found in both eyes. Day vision for distance is good. He was put on liver treatment on 16th September; this consisted of 4 chittak (8 oz.) of goat's liver, fried in oil and spices. No drug treatment was used. The improvement was most marked and rapid; after only 48 hours of liver feeding, he expressed himself as

* Clinical Lectures, p. 265.

† *British Medical Journal* March 31st, 1888; also *Provincial Medical Journal*, April 1893.

greatly improved in his night sight; he continued to improve rapidly, and was discharged cured to his work after ten days. No relapse.

CASE 2.—Sasti Bhola, aged 30, a convict overseer in this jail for over 4 years. Weight on admission 118lb; height 5ft. 6in. Present weight 127lb, is fat and sleek. No previous admissions to hospital, except for mumps in November 1898, and for malarial fever in February 1899. He was found to be suffering from night-blindness when promoted to the position of a night guard. The patient states that he suffered from an attack of night-blindness last year for several months, but his sight got better as the cold weather wore on. The present attack has lasted, he states for about two months.

Eyes: No conjunctivitis, one small porcelain-like white patch on outer side of left cornea, and a pigmented xerosis like that described in the first case, on both sides of both corneæ. He was put on the liver treatment on 20th September; the improvement was marked and immediate. On the third day he stated that the improvement was distinct. He was rapidly cured and discharged to work after ten days' treatment. No relapse up to date.

CASE 3.—Buina Tatwa, aged 22, came from Durbunga, in this jail for over 13 months. Had been ill with fever while in Durbunga, and there weighed only 88lb. Since arrival here has been constantly in bad health; in hospital for stomatitis in September 1899; in January 1900 for irregular action of the heart; he then remained for some time in the convalescent gang; re-admitted for stomatitis in February; for diarrhoea in April; for malarial fever in April; for chicken-pox in May; and again for malarial fever in July 1900. Since then he has been in the convalescent gang, and has slowly improved in health, his weight having risen to 104lb. He has suffered from increasing night-blindness for the past two months; this is well known to his comrades in the gang who are accustomed to lead him about after night-fall. He was put on liver treatment on 19th September, and after a few days' feeding he stated that his "eyes were becoming open at night." Since then his vision has greatly improved, and at the time of writing he is able to see clearly at night, as well as any normal person. He had the same pigmented xerosis of the conjunctivæ, as described in the other cases.

CASE 4.—Santoki Keiri, aged 20, height 5ft., weighs now 104, having risen from 98lb. He has been ten months in jail, and in apparent good health, having been only once in hospital for diarrhoea in April. The night-blindness, he says, came on about a month ago; he has to be helped about the ward at night; the day vision is good; the conjunctivæ are in a similar condition to those described above.

Put on liver treatment on 22nd September, and in a few days he expressed himself as greatly benefited, and in fact was proved to be able to go about by himself after dark, or in the dimly-lit ward. Since then he has had no relapse.

CASE 5.—Chabila Dosadh, aged 25, weighs 147lb., height 5ft. 7in., a big sturdy native of the North-West Provinces, convicted of dacoity in Dinajpur in E. Bengal. He has been one year in this jail, and has been in uniformly good health. He has recently been promoted to position of night watchman, and was sent to hospital by the jailor as he was found to be unable to find his way about at night. He states that the night-blindness has existed for only three or four weeks past. The conjunctivæ have the same appearance as already described in the other cases, his day vision is good for all distant objects; nothing abnormal was found by the ophthalmoscope. He was put on liver treatment on 22nd September, and was rapidly cured as in the other cases. He is now able to do his work as a night watchman.

Remarks.—I regret that these cases have not been recorded in a manner more satisfactory to an ophthalmologist. I examined them with the ophthalmoscope but could find nothing abnormal, certainly there was nothing like retinitis pigmentosa present. The peculiar pigmented scaly condition of the conjunctivæ was almost identical in all the cases; this I take to be the condition of xerosis, which has been described in nearly all cases of night-blindness, though no definite connection between the two conditions has ever been established. (Swanzy, 7th Ed., p. 516). It may be noted that at the time of the discovery of the night-blind condition only one of the five patients was in a cachectic condition; the others were sleek and fat, and it was only their inability to see their way about after sunset that prevented them from doing their work. I took special pains to obtain clear evidence as to the genuineness of the night-blindness in each instance before putting them on treatment.

Night-blindness is a pretty common complaint in India at this season of the year, i.e., at the end of the rainy season. In jails often too little attention is paid to it, and prisoners themselves, unless they have work to do at night, do not bother much about it.

The causation of the disease is not very well known; it is usually stated to be associated with cachectic conditions, as malarial cachexia or scurvy, &c. In the case, No. 3 above, the two admissions for stomatitis might point to a scorbutic condition, but the man has had certainly no other symptoms of the disease. The other cases were at the time of examination in good health otherwise. All had certainly suffered at times from malaria, but so has nearly every man in Bengal. It may only be a coincidence, but all the patients dated their night-blindness from a period shortly after the great heat and sunshine of the hot weather. Swanzy (*loc. cit.*) states that nyctalopia is "often the result of long continued dazzling by very bright sunlight, or of lengthened exposure to bright firelight (e.g. of foundries), and it is probable that in many, if not in most, instances of this affection defective nutrition of the system plays the chief rôle in rendering the patients liable to it. Thus in scorbutus, acute nyctalopia has been frequently seen when the patients have been exposed to strong glares of sunlight." (Diseases of the Eye, p. 516.)

In India in my experience the complaint is certainly most common in the usual autumnal fever season.

As regards the treatment I purposely gave the patients no other form of treatment except the liver. This was goat's liver, given fried with oil and spices, twice a day in quantity four chittaks (8 oz.) per diem. No drugs were used. I was much surprised at the very prompt

good results, which seemed almost too good to be true, so that I wrote to some of my friends in other jails to ask them to try it, and corroborate my results. However, on again reading the extract, quoted by Major Maynard, I find that Dr. Trantas of Constantinople has had exactly similar immediate good results. He gave 200 grammes of liver per diem, which is about the same quantity as my patients received. The remarkably sudden and prompt effect of the ingestion of liver in these cases almost resembles the effects of thyroid feeding in myxoedema and the cretinoid states, and consequently I have been on the watch for relapses of night-blindness as soon as the liverfeeding was stopped, but so far none of the patients have relapsed, and I have every hope that their cure is, for this year at least, a permanent one. I have been informed that the treatment is not unknown in India among the Natives, though I had never heard of it before. Trantas, in the article quoted, tells us that the treatment was used by Hippocrates, but it has not found its way into any text-book that I have been able to consult.

It may be worth while mentioning that Trantas mentions (without describing) what he calls "liver fumigations;" this I do not understand, but I am told that the people of India often heat the liver over a hot iron and smear the eye with the fat which bubbles up on heating it. This may be something like the "fumigations" of Trantas.

I have since heard from Captain R. H. Maddox I.M.S., at Chapra, and Captain J. T. Calvert, I.M.S. at Durbhunga, and both have found the liver treatment equally effective and immediate in its results. A treatment so pleasant as liver fried with spices will naturally attract many old jail-birds to hospital; therefore at the suggestion of Major Andrew Buchanan, I.M.S., of Nagpur, I am trying the effect of cod-liver oil instead.

RESEARCHES INTO THE INTRA-CORPUSCULAR PARASITES FOUND IN THE BLOOD OF LIZARDS.

By C. F. FEARNSIDE,

Captain, I.M.S.,

Superintendent, Central Prison, Rajahmundry.

For those desirous of getting an insight into parasites affecting the blood there is no animal so handy or so easy to manipulate as the lizard.

To examine the blood an incision is made in the skin over the carotid artery which being pricked exudes a drop of blood. The blood does not coagulate so quickly as that of warm blooded animals, and the droplet on the cover-glass spreads as a fine film on the slide. Ross'

fresh method (*viz.*, a few grains of methylene blue having been previously put on the slide) may be employed for rapid work, or Romanowski's method for preservation and mounting.

The object of this paper is to describe these endoglobular parasites found in the lizards that inhabit our bungalows and at the same time to discuss their evolution. It will be noticed that I speak of more than one parasite affecting the red cells which depends entirely on the manner in which the development is viewed. There frequently exists in the blood of cold-blooded animals certain sporozoa called *hæmosporidia* or *hæmogregarines* which have a cycle of development different from the *gymnosporidia* which are found in the blood of man and birds. The *hæmosporidia* are characterised by living at one time free in the serum of the host and by a true encystment which ends their period of growth. They are usually found in the blood of frogs, lizards, &c., and their cycles of growth are the same. The specific name given by Labbé to that found in the lizards is the *karolysus*, a parasite similar to the *dreparidium* of infected frogs (*Rana Esculentu*). Having no other work than that of LeDantec, I shall make extracts from it for general information. In afterwards contesting the evolution described by this writer, it will have to be assumed that the researches made on the lizards here disclose a parasite identical with the *dreparidium*. The description given resembles so closely the parasites found by me that I feel certain I am working with the same organism. The *dreparidium*, according to this writer, is at first a small elongated body, hyaline or finely granular, and furnished at its centre with a chromatic granule or nucleole, being at the same time narrower towards the centre and seemingly divided into two segments, the one hyaline containing the nucleole, the other granular containing chromatic granules. This sporozoite now enters a red corpuscle to develop into the *hæmogregarine*. The first segment, still hyaline, grows as it were to one side and forms a fine point at its anterior extremity, while the other increases and exceeds the former in point of size. When the development is complete, it is no longer divided into two distinct parts, but acquires a uniform texture. The body has now all the appearance of a monocystic *gregarine*. In this condition the *dreparidium* is able to quit the host cell and live a free life in the serum, and being pointed at its anterior extremity, it is able to move easily amongst the erythrocytes. It is proved beyond doubt that fusion often takes place; a veritable conjugation of two individuals. According to Labbé, there follows a fusion of the protoplasm vacuoles and nuclei with the result that the new individual only differs in size from the original two which went to form it. After

a certain time of free existence in the serum whether conjugation takes place or not, the dreparidium re-enters a fresh corpuscle or leucocyte, &c., and curving on itself, the ends meet, fuse, and a round or oval organism is formed in which the vacuoles quickly disappear. This new formation gradually increases and fills the greater part of the nucleated red corpuscle and takes on an ellipsoidal shape. In a later stage a distinct membrane makes its appearance surrounded by the hæmoglobin of the erythrocyte. Labbé calls this the cytocyst which contains both plastic and chromatic granules. Spores are now formed which are liberated by the dissolution of the cyst wall, and these give rise to microsporozoites or macrosporozoites (depending on the number of spores formed) which float in the serum of the animal ready to inoculate fresh cells.

There are, therefore, three phases in the endogenous cycle of this parasite.

- I. A phase of growth in a host cell.
- II. A phase where the organism is free in the serum.
- III. A coccidium phase characterised by encystment inside a red cell and subsequent sporulation with a "rel-
quat de segmentation."

It is these three phases of the endogenous cycle which I propose to review and to give the results, in as clear a way as possible, of a large number of blood examinations.

For easy reference I shall name phase I as hyaline crescents; phase II as the free crescents; phase III as the pigmental oval. If nature has deemed it necessary that the organism should quit the red corpuscle, in which it has grown to a certain size, and to live free in the serum, it must be for some definite purpose. According to Labbé, whether conjugation of two individuals takes place or not, the free crescent re-enters a red cell to complete its encystment phase as a pigmented oval. One can conceive that a definite purpose in its exit from the cell would be fertilization by some male element (a chromatoid) or conjugation. Only in one instance have I seen the union of two individuals which probably occurred inside the red cell prior to escape from that cell. Reference will be made to this solitary instance at a future time. I have also seen in one badly infected lizard two crescents in the same red corpuscle; but one cannot assume this as a case of conjugation. It is merely a red cell infected by two parasites starting from two separate sporozoites. If the free crescent stage is not for fertilization, it cannot be for the purpose of increasing in volume, because the organism re-enters another corpuscle of the same size to complete as final phase of encystment. There is as far as I see no reason why the parasite should quit the

red cell which it originally occupied, nor why it cannot complete its final phase without the free intermediate stage. The question at once arises, is there a free phase in the serum and does the crescent become an oval? The malarial crescent and the spring tertian parasite show no flagellation while in the blood of the host as proved by Ross. It is only the altered conditions on the microscopic slide, or in the mosquito's stomach that this extra corporeal phase takes place. The hyaline cell (male element) of the proteosoma shows no flagellation till the blood is drawn from the infected bird. I shall endeavour later on to show that the free crescent or phase II is really the result of extra corporeal conditions, and that the hyaline crescent and the pigmented oval exist independently of one another, and that the hyaline crescent does not become a pigmented oval because I had failed to meet with this conversion of the hyaline crescent into a pigmented oval (encysted phase III).

THE PERCHLORIDE TREATMENT IN PLAGUE.

By G. S. THOMSON, M.B., M.Ch., M.A., D.R.U.I.,
MAJOR, I.M.S.,
14th Bo. Infy.

IN redemption of a pledge made some time ago the following analysis of the results of perchloride of mercury in plague are published for the benefit of the profession. The statistics may be regarded as fairly accurate and as nearly impartial as possible; as they were firstly compiled by the respective hospital assistants in subordinate charge of the two hospitals and without any idea of the purpose for which they are now used. Apparently they were only to show the relative rates of mortality for buboes in different situations.

The two hospitals were under different medical officers. Dr. Walton for a short time, and subsequently Dr. Beach had charge of the Budhwar Plague Hospital in which the ordinary tonic, stimulant, expectant treatment of symptoms was carried out exclusively. The figures are taken from bubonic cases only in order to exclude those of doubtful diagnosis; those of malignant primary pneumonic plague in which all treatment is useless, and those admitted moribund. As both hospitals were open simultaneously during the first Satara plague epidemic, and daily received as nearly as possible half the cases discovered by the search parties working morning and evening, there can scarcely be any appreciable chance differences on the severity of the cases admitted for treatment.

For the same reasons the statistics show better than those of Parel Hospital, the results of treatment amongst all cases admitted to hospital from an epidemic area; and although in Satara there were 150 "deaths out of hospital" during the first epidemic of 722 attacks, amounting to 20 per cent. of the cases, therefore, it would be impossible to tell how many attacks the Parel admissions represented. In the report on Parel Hospital by excluding moribund cases, those due to pneumonia and cases treated by Yersin's and Haffkine's serum and by other methods, the General Hospital mortality was 66 per cent. about; and this would represent all cases treated by perchloride of mercury as a routine practice.

Being rather sceptically inclined regarding drug treatment and believing more in good nursing and the benefits of rest and a comfortable bed, although fully recognizing the usefulness of an appropriate drug, rising almost to the dignity of a remedy, administered at the proper time; still the impression remains that perchloride treatment is at least as useful as any other in plague. There were some very marked effects following large doses in comatose cases, and by hypodermic injection below the first affected bubo; but in other instances apparently promising equally successful results, the treatment although pushed ended in failure to cure. Salivation was never seen, and that is a word one is averse to using except on good grounds, although the same solution of mercury used on suspected but non-plague patients with buboes immediately gave the physiological action of its active ingredient. As a confession of faith in drug treatment, results might be stated fairly thus: In the graver forms of plague, medicine has been confessedly useless; in the milder, it was probably unnecessary; in the intermediate shades it may have had some influence. In plague, to use an old simile, if the medical attendant can enable the shattered bark to weather the oppressing gale and mount the billows of complications, he may hope to reach a haven of safety and restoration to health.

From Ranchatri Plague Hospital: Mercurial treatment.

Site of Bubo.	Admitted.	Died.	Recovered.	Mortality per cent.
Left groin ...	102	72	30	70
Right groin ...	87	65	20	75
Left axilla ...	25	22	3	88
Right axilla ...	23	19	4	82
Left neck ...	28	21	7	75
Right neck ...	32	25	7	78
TOTALS ...	297	224	73	75.42

The average mortality therefore in bubonic cases under mercurial treatment was about 75.42 per cent. of admissions.

From Budhwar Plague Hospital: Expectant treatment.

Site of Bubo.	Admitted.	Died.	Recovered.	Mortality per cent.
Left groin ...	31	22	9	71
Right groin ...	23	17	6	74
Left axilla ...	22	19	3	91
Right axilla ...	17	12	5	71
Left neck ...	11	11	0	100
Right neck ...	15	12	3	80
TOTALS ...	119	93	26	78.16

The average mortality, therefore, in bubonic cases under the expectant treatment was about 78.16 per cent. of the admissions; this gives about 2 or 3 per cent. of recoveries more under the perchloride of mercury treatment as nearly as possible 2.64 per cent. In a disease so fatal this undoubtedly is fairly satisfactory, for those who refused hospital treatment only gave 11 per cent. of recoveries, and about 20 per cent. of those attacked died out of hospital, whereas those submitted to all kinds of treatment including primary plague pneumonia, non-bubonic and fulminant cases gave 22 per cent. of recoveries. A margin of 3 per cent. therefore in favour of our line of treatment is encouraging, and shows it is worthy of further and more extensive trial; but in no case is it to be regarded as a remedy to the exclusion of rational therapeutic measures.

THE TREATMENT OF SKIN DISEASES IN
FRANKFURT (NOTES FROM DR. KARL
HERXHEIMER'S CLINIC
AND POLICLINIC.)

By W. D. SUTHERLAND, M.B.,

CAPTAIN, I.M.S.

(Continued from page 391.)

Acne vulgaris.—The parts are daily smeared with this salve:

R Ac. Tannic ... partes 5
Sulphur Præcip. ... " 10
Vaselini [...] " 85
M.ft. Ungt.

When the irritation caused by this treatment becomes very marked, the treatment is suspended for a couple of days or so, and then resumed. Or the parts are painted daily with this lotion:

R Lin. Sulphuris ... partes 6f
Glycerini ... " 1

or, preferably, the following treatment is employed.

For half an hour once daily for five days the parts are covered with Herxheimer's salve:

R Resorcin resubl.
Zinci Oxid.
Amyl. tritici aa partes 20
Vaselini ... " 40
M.ft. Ungt.

This is then removed with the spatula and oil-rag, and at night the parts are thickly smeared with Wilson's salve:

R
Zinci Oxid. ... gr. 60
Tinct. Benzoin Simpl. ... 3i
Axung. ... 3i
Vel. or Lanolini }

M.ft. Ungt. to be applied nightly, for five nights.

This is left on all night and washed off with soap and hot water in the morning. After five days' treatment with the two salves, the result is observed and nothing done for at least ten days.

Scabies—For this affection Wilkinson's salve

R
Ol. Rusci ... 3iiss
Sulph. Præcip. ... gr. 150
Sapon. virid. ...
Vaselini ... aa gr. 300

M.ft. Ungt. is used.

All the affected region is smeared with this salve once a day for three days, and on the fourth day the patient is given a warm bath, even although he may be suffering from scabies-eczema.

Or the parts are painted with:

R
Bals. Peruv.
Styracis liquid, aa partes æquales.

M.ft. pigment.

This is applied once daily for three days and then removed with spirit.

By either of these methods of treatment the *acarus scabiei* is killed, and the eczema is then treated as detailed *supra*.

Lupus.—The larger tubercles are touched with a point of lapis infernalis, and this treatment helps the physician in his diagnosis: for where no tubercle exists, there the skin remains unbroken when the point is pressed well down; whereas, when the skin is affected, a marked solution of continuity is left. After touching the larger tubercles with the point, the whole affected surface is covered with this salve:

R
Ac. Pyrogallie partes 1—10
Vaselini @ 100.
M.ft. Ungt.

Liq. Alum Acetic (Ph. Germ) is thus prepared

I. R
Alum Sulph. ... 3i
Aq. Distil. ... 3iiss solve et
Add Ac. Acet. dil. ... 3i

II. R
Calc. Carb. ... 3ss
Aq. Dist. ... 3iij

Shake this well, and then pour II into I: leave for twenty-four hours and then filter.

Liq. Sulphuris Ph. Germ.—

R
Sulph. Præcip. ... gr. 15
Aq. Amygdal
Glycerini ... 3i
Aq. Calcis ... 3ss
M.ft.

One begins with a 1 or 2% salve, and then increases the strength as the patient becomes used to the action of the acid, which seeks out the tuberculous patches, having the healthy tissues untouched. The part is kept constantly smeared with the salve, and then when marked improvement results from the application of an 8 or 10% the strength of the salve is gradually reduced to 8 or 6%, then 4 or 2% and finally 1%.

That lupus can be well treated thus with good cosmetic results, I have had ample opportunity of judging, for lupus is very common in this part of the world.

During the treatment the patient's urine is examined once a week for albumen and casts, as a slight nephritis may be set up by absorption of the pyrogallie acid. This pyrogallie-acid treatment was originated by Dr. Veil of Kannstadt.

For parasitic affections of the skin, accompanied by marked chronic infiltration of the cutis, Unna's mercury muslin-plaster is much used. The plaster is cut to fit the part affected, and is renewed every day till the infiltration has become a thing of the past, when a parasiticide, such as Paraform-Collodion, is applied.

From what goes before, it will appear that the polypharmaceutical internal medication, so dear to some British dermatologists, finds but little favour in Dr. Hersheimer's eyes. For syphilis mercury and Pot. Iod. for psoriasis—and I may add lichen ruber—arsenic; for other affections only local treatment is prescribed, and to judge from the very satisfactory results obtained, this is all that is required.

THE WIDAL REACTION IN THE DIAGNOSIS OF TYPHOID FEVER: A RESUME OF WHAT IS KNOWN ON THE SUBJECT.

By P. S. CHANDRA SEKAR, B.A., M.D.

Historical.

THERE are few diseases in which the presence of some unfailing pathognomonic sign would be more useful than in typhoid fever. There is not a single sign or group of signs which can be said to be pathognomonic of the disease and invariably present in all the cases. Although the clinical course of the disease renders the diagnosis easy in the larger number of uncomplicated cases when the disease is well advanced, the masked and insidious onset renders the diagnosis in the earlier stages very difficult and doubtful. Even when the disease is more advanced, difficulties in diagnosis often arise on account of the complications and also the close resemblance which the disease sometimes bears to many other fevers, e.g., pneumonia, acute tuberculosis, &c.

The diagnosis may be uncertain in very mild cases, in abortive cases, in very acute cases where there is a severe typhoid intoxication and in cases complicated with lesions other than those of typhoid fever. Till about the middle of 1896, there were three other methods of diagnosis to help the clinician to confirm his clinical diagnosis. These were, firstly, Ehrlich's diazo-reaction; secondly, the blood count; and thirdly, the bacteriological examination of the stools, and urine for the detection of typhoid bacilli. The relative merits of these methods will be discussed later on. But it is enough to state here that the first method is not pathognomonic of typhoid fever as it is found in many other diseases besides typhoid, that the second method is of very little value in complicated cases and that the third method presents considerable difficulties even in the hands of experts owing to the great resemblance (both morphological and cultural) between the typhoid bacillus and the colon bacillus which is constantly found in the stools.

In June 1896 a most important advance was made in the method of diagnosing typhoid fever, *viz.*, the discovery of the *Widal* reaction.

Widal of Paris observed that when typhoid serum (*i.e.*, the serum derived from a typhoid patient) was mixed with a culture of typhoid bacilli and examined microscopically, certain characteristic changes took place. The bacilli which were extremely motile in the culture before admixture with the typhoid serum, began to lose their motility and ran together and become agglomerated into clumps of bacilli. Or to put briefly, the changes consisted in the "agglomeration" and "immobilization" of the bacilli. When he mixed the typhoid serum and the culture of the typhoid bacilli in a test tube, the same changes were found to take place in the bacilli, and they were rendered manifest to the naked eye after a few hours by the formation of a sediment (consisting of the agglomerated bacilli) and the clearing of the supernatant fluid which was no longer turbid as the bacilli were no more distributed in the latter.

Since Widal announced his discovery in June 1896, the question has been enthusiastically taken up all over the world by a host of observers who have recorded their experiences in the various scientific journals, and in their communications to the various medical societies. In this way has arisen an enormous literature which I intend to summarise in this paper.

This test is one of the many instances of the practical aid given to medicine by purely bacteriological research. This test may be considered as a bye-product in the purely scientific study of the causation of immunity.

In 1889 Charrin and Roger observed that when the serum of an animal which had been injected with living or dead cultures of the bacillus

pyocyaneus, was mixed with the living culture of the same bacillus in a test tube, the turbid mixture began to clear in a short time and ultimately resolved itself into a flaky precipitate which settled at the bottom of the tube and a supernatant clear fluid. (It is needless to say that the turbidity of a culture is due to the distribution of innumerable bacilli which intercept the light.) They also noticed that when the living culture was mixed with serum of a non-immunised animal, the turbidity was uniform and never disappeared (*i.e.*, the reaction was absent).

In 1894 Issacff and Ivanoff made a similar observation on a vibrio described by the latter.

Stein was the first to investigate the immunising powers of the serum obtained from convalescent typhoid patients upon animals, and he found that animals could be rendered immune to the typhoid bacilli, by the injection of such serum from the typhoid convalescents, in the majority of cases. Pfeiffer in following up this line of work, discovered his "specific immunity reaction."

In 1894 Pfeiffer observed that if living cholera or typhoid microbes be injected into the peritoneal cavity of a guinea-pig previously immunised against the respective microbes; the living microbes underwent first immobilisation and agglomeration and subsequently granular degeneration ending in total disappearance. He studied these changes by examining the peritoneal exudation from time to time after the injection. But when he injected bacilli of a different species from that used in previously immunising the guinea-pig, he noticed that the changes did not occur. The next step he took was to mix a living typhoid culture with the serum of an animal immunised against typhoid, and inject the mixture into the peritoneal cavity of a non-immunised animal. The results were, of course, as he expected, *viz.*, clumping, granular degeneration and disappearance of the bacilli. As he found the peculiar changes to be produced in a species of bacilli only by the serum of an animal immunised against that particular species, he considered the reaction as a specific one. The clumping, granular degeneration and ultimate absorption of the microbes observed when specific living organisms were injected into the peritoneal cavity of an animal immunised against that organism came to be known as "Pfeiffer's Reaction."

After this observation was made by Pfeiffer, this particular reaction came to be used as a test for doubtful cultures of the typhoid bacillus. Pfeiffer and Kolle advocated this test to distinguish the typhoid bacillus from the closely resembling colon bacillus. Shortly afterwards Metchnikoff and Bordet showed that the peculiar phenomena observed by Pfeiffer

could be demonstrated outside the animal body, by examining microscopically a hanging drop preparation of the serum of an animal immunised against the specific microbe, to which has been added an emulsion of the doubtful culture. (One drop of serum plus two drops of emulsion.) They found that if the microbes were the specific ones, they clumped together; and the effect of adding a large proportion of the immune serum was found to be a granular degeneration of the bacilli. These changes were further noted to be absent when the suspected microbes happened to be other than those against which the serum-yielding animal had been immunised.

The next step forward was taken by Gruber and Durham, who on mixing in a test tube the culture of the microbe to be tested with a more or less diluted serum from an animal immunised against the microbes to be identified found that the fluid in the test tube became clear owing to the formation and subsidence of a precipitate whenever the microbes belonged to a species same as that previously used for immunising the animal. Between November 1894 and May 1895, Gruber and Durham were engaged in a series of experiments to test the limits of Pfeiffer's method of diagnosing microbes and to point out the use of the method for various objects.

Gruber in an article in the *Wiener Medicinische Wochenschrift* for March 1896, criticized Pfeiffer's conclusions and attempted to show that Pfeiffer's reaction was by no means specific, and that when the reaction was positive, the diagnosis was still doubtful, as the reaction was quantitative only and not qualitative, so far as the cholera vibron was concerned. Gruber, however, expressed the opinion that it was of greater service with regard to the typhoid bacillus and concluded that those investigations would render great assistance in the clinical diagnosis of cholera and typhoid fever.

Durham contributed a paper embodying the result of the experiments carried on by Gruber and himself in 1894-95 to the *Journal of Pathology*. He states "Hitherto my efforts to produce clumps by means other than the fluids obtained from immunised animals have failed. Whilst the blood or serum and the peritoneal fluid of immunised animals have this curious power, the fluids which have been artificially prepared (by culture, &c.) are not able to cause the formation of clumps. Neither does the fluid of the normal animal nor of animals immunised against distantly related organisms possess this remarkable power."

Some of the conclusions in his paper are very interesting as bearing upon the subject of this paper.

Out of nineteen races of typhoid bacilli not one failed to react positively with the typhoid serum, and out of ten races of the colon bacillus (the one

that is usually confounded with the typhoid bacillus) not one reacted with the typhoid serum (from animals immunised against typhoid).

In spite of these advances, in the beginning of 1896 the bacteriological examination of typhoid fever still remained difficult on account of the initial difficulty of isolating the bacilli from the stools. Further, it required at least three days to isolate the bacillus.

But after the isolation of bacilli, it was possible to diagnose with certainty whether they were really typhoid bacilli or not. There were at that time four methods of verifying the species of the bacilli isolated.

The first method consisted in cultivating the suspected microbe in the serum of an animal immunised against typhoid fever (this can be called for brevity's sake typhoid serum) and noting whether, at the end of the experiment, the serum was clear or not and a precipitate had formed or not. This was the method of Charrin and Roger.

The second consisted in the injection of the suspected microbe after the addition of typhoid serum to it into the peritoneal cavity of a guinea-pig, and the subsequent examination of the peritoneal exudation for immobilisation and granular degeneration (glabrification). This was the method of Pfeiffer.

The third consisted in the microscopical examination of a hanging drop preparation of the suspected microbe in the typhoid serum. This was the method of Metchnikoff and Bordet.

And the fourth method, that of Gruber and Durham, consisted in mixing the culture of the suspected microbe with the typhoid serum (not growing the microbe as was done by Charrin and Roger) in a test tube and observing whether the liquid became clear after the formation of a sediment.

It must be borne in mind that all these observers, as they were bent upon verifying the nature of suspected microbes, started with the serum of an animal immunised against the typhoid bacilli as a known factor and used the typhoid serum to diagnose the species of suspected bacilli.

Widal, however, in 1896 conceived the happy idea of reversing all the experiments which had been made up to then; and he started with a culture of genuine typhoid bacilli as the known factor and proceeded to diagnose the nature of the unknown serum and consequently the nature of the infection in the individual yielding the serum; or, to put it in other words, he began to use typhoid cultures to determine whether a patient was suffering from typhoid fever or not. He mixed the serum from cases of suspected typhoid fever with a genuine typhoid culture and watched for the phenomena mentioned by Charrin and Roger, Metchnikoff and Bordet, Pfeiffer, and Gruber and Durham.

Widal found that the serum of typhoid patients soon after the beginning of the fever (four or five days after the commencement) was able to produce in a pure culture of the typhoid bacilli immobilisation and agglomeration of the microbes, whereas the serum from healthy people and non-typhoid patients had no such effect. As he found that the reaction was specific and took place rapidly, he announced on the 26th of June 1896, that the method of serum diagnosis of typhoid fever was a very reliable one.

In his original communication he described several processes.

Later on Widal and Sigard observed that dead cultures of the typhoid bacilli were quite as efficacious as living cultures of the typhoid bacilli in the production of the reaction. The bacilli when killed by heat, by a temperature of between 57°C. and 60°C. or preferably by adding a drop of formalin to the culture (1—150), were found to retain their agglutinating properties (which were embalmed as it were) for at least three months.

also retain the agglutinating properties, and his expectations have been completely realized by his extensive series of observations.

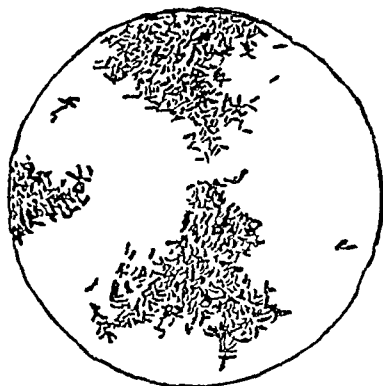
The serum reaction having been proved to be specific in nature, the method of sero-diagnosis has been extended to many other diseases in recent times.

The following is a list of the diseases to which sero-diagnosis has been extended:—

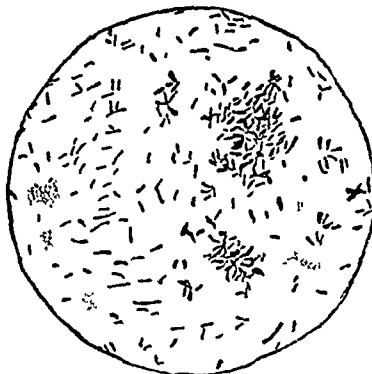
Cholera.	Relapsing fever.
Diphtheria.	Scarlet fever.
Colo-bacillary infection.	Tetanus.
Malta fever.	Streptococcus infection.
Plague.	And some other diseases.
Yellow fever.	

From the contributions of Grunbaum and Durham to the *Lancet*, it appears that Grunbaum had been working on nearly the same lines as Widal at the same time and had obtained analogous results. But Grunbaum cannot certainly claim for himself the credit which is justly attached to Widal on account of his discovery.

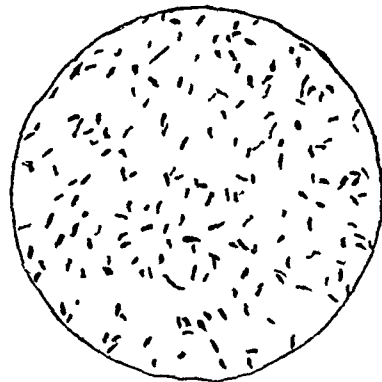
Durham states in the *British Medical Journal* of 3rd September 1898, that the reaction was



Typical Reaction.



Pseudo Reaction.



Bacillus Typhosus, Normal Blood.

The use of dead bacilli in the diagnosis of typhoid fever brings the test within reach of practitioners far removed from bacteriological laboratories. Wright has taken much pains to popularise the use of the dead bacilli.

Widal further found that the agglutinating property was not confined to the liquid fresh serum and blood, but was also present in solutions of the dried blood or serum.

But Wyatt Johnston of Montreal seems to have discovered the property of dried blood solutions to agglutinate the bacilli, before Widal made the similar observation on dried blood.

As the reaction appeared to depend probably upon the presence of substance analogous to the ordinary toxins and as many of the latter preserve their characteristics in the dry state, it occurred to Johnston that the dried blood might

first observed in the Hygienic Institute of Vienna by Grunbaum working at the suggestion of Gruber, and that the subject was first brought forward by Gruber at the Medical Congress of Wiesbaden in April 1896.

Grunbaum, writing to the *Lancet* of 28th November 1896, states that he had anticipated Widal in the study of the serum reaction, and after briefly referring to Widal's short communication of the 26th June 1896, sets forth his claims of priority to the discovery. He writes that his method was being employed in Vienna from March 1896 onwards, and that Gruber had mentioned it in the Medical Congress on the 16th of April 1896, i.e., two months before Widal announced his discovery.

From Grunbaum's own communication to the *Lancet* of 19th September 1896 (p. 806) it is evident that the suggestion thrown out to

Grunbaum by Gruber was to investigate the value of the reaction in identifying by its aid the bacteria isolated from the stools of typhoid patients, and not in diagnosing typhoid serum with a genuine typhoid culture; and it was the investigation of this point with which Grunbaum was concerned. No doubt Grunbaum independently made the same observations as Widal, but he was not working with the idea of establishing a sero-diagnosis of typhoid fever. But Widal, in a moment of inspiration, conceived the idea that the reaction is one more of infection than of immunity, and this view made him test the blood in the earlier stages of the disease and establish the sero-diagnosis of the disease. As everybody before Widal thought the reaction to be one of immunity a condition which comes into existence only in the later stages of the disease, the thought of utilising the reaction for diagnostic purposes never struck any one of them. The idea that the reaction belonged to the stage of infection (whether attended or not with more or less of immunity from the beginning of the infection) was absolutely essential before the reaction could be utilised as a means of diagnosis (especially in the earlier stages). And there is no denying the fact that *this idea first occurred to Widal*. As all the other observers were very much engrossed with the idea of *immunity* (they were really studying the causation of immunity) they failed to grasp the diagnostic value of the reaction. It is indeed most remarkable that some of the observers though on the verge of discovering the diagnostic value of the reaction in typhoid fever, missed the discovery for the reason assigned above.

(To be continued.)

A Minyon of Hospital Practice.

ACUTE INFLAMMATION OF THE GALL-BLADDER AND LIVER ABSCESS: OPERATION.

By D. M. MOIR, A.M., M.D.,

MAJOR, I.M.S.,

General Hospital, Chittagong.

History.—On the 28th March I saw in consultation B., a Hindu woman, 41 years of age, the wife of a railway clerk. She was then suffering from malarial remittent fever, and had been ill for a fortnight. About the middle of April her medical attendant detected a tender lump, the size of a walnut, on a level with the umbilicus and two inches to the right. It seemed to him to be quite separate from the liver, and as it had appeared some days after a blow in the abdomen, he suspected a parietal abscess.

On the 25th April I was consulted for the second time. The patient looked very ill, weak,

and emaciated, had high fever, and was suffering acute pain in the right side of the abdomen. A tender swelling, the size of a crown, could be made out, and percussion elicited dulness about the junction of the right lumbar and umbilical regions, extending downwards to the level of the navel and merging afterwards in the hepatic dulness. My diagnosis was an abscess bulging downwards from the under-surface of the liver, and I recommended prompt removal to hospital for operation.

Operation on the 26th April.—A vertical incision, two inches long, commencing a finger's breadth below the costal arch and one inch internal to the tip of the 10th rib, ending almost on level with the navel and $2\frac{3}{4}$ inches to the right. On opening the peritoneum some clear serum and flakes of lymph escaped, and acutely inflamed omentum matted to coils of intestine was seen. The adhesions were soft and easily separated, exposing an intensely congested, long, tense tumour, the shape of a Bologna sausage, which extended downwards much below the liver and upwards and backwards to the under-surface of that organ. The needle of an exploring syringe was inserted into the tumour; about 4 ounces of clear mucus and a little pus were drawn off, but there was not a trace of bile. Tension having been to some extent relieved, the cyst was next drawn up to the abdominal parietes and fixed by overlapping silk sutures to the edges of the incision. A dry dressing was applied and the patient put to bed. Two days later, 28th April, the wound being securely shut off from the peritoneal cavity, the gall-bladder was incised and a large drainage tube introduced. There was copious discharge of bile. Prior to operation the stools resembled clay in colour and consistence, after operation and drainage the motions were deeply bile-stained.

Course of the case.—After the day of operation the temperature remained practically normal, and gave no anxiety until the 19th May, when it suddenly shot up to 105.2° F., owing to an attack of ague which yielded readily to quinine.

During the operation of the 26th April only a small portion of the contents of the greatly distended gall-bladder were drawn off by the exploratory puncture. There was no sign of bile, only clear mucus with some pus towards the end of the aspiration. When the gall-bladder was opened on the 28th April the discharge of bile was copious and continued so till the end of the month. On the 1st May, however, typical liver pus replaced or obscured the bile, and there was evidence of liver pus for the following five days. After this the discharge resumed its character of greenish bile and glairy mucus. The drainage tube was removed on the 8th May, and next day some of the silk sutures.

On the 21st May the sinus leading into the gall-bladder barely admitted a probe, so the surface was dried and covered with cotton-wool

and compound tincture of benzoin. The patient was also instructed to lie as much as possible on her left side, so as to give the sinus a better chance of closing, as would be the case if no bile was being discharged. She carried out instructions most faithfully, with the result that the sinus into the gall-bladder healed completely between the 26th and 28th May; and there remained only a small superficial ulcer the size of one's thumb nail, which quickly healed. She was discharged on the 3rd June, with instructions to wear a binder or abdominal belt for six months.*

Remarks.—The course of events would seem to have been as follows: Acute inflammation of the gall-bladder and an adjacent small liver abscess were co-existent. The cystic duct was blocked by inflammation, hence only mucus and pus were found in the gall-bladder at the primary operation. Soon the cystic duct became patent, and bile appeared at the secondary operation. Later, the liver pus found access to the gall-bladder and was discharged through the drainage tube.

After the abscess was evacuated only bile and mucus escaped from the gall-bladder. By careful attention to position, keeping the wound in the gall-bladder uppermost, the sinus was allowed to heal, and so a secondary operation to close the gall-bladder was avoided.

CASE OF CÆSAREAN SECTION.

D. SIMPSON, M.D.,

MAJOR, I.M.S.,
Civil Surgeon, Coimbatore.

ON the 9th of July, at 4 A.M., I received a note that a woman had just been admitted to hospital in labour with a hand presentation, I at once proceeded there and, upon examination, found that it was not a hand presentation but that, instead, both feet were presenting, the membranes having been sometime ruptured. So intent was I upon determining the matter of presentation, that I did not for a minute or two realise that I had to face a pelvis contracted to a marked degree. It was impossible for me to pass two fingers together through the pelvic outlet, which I found afterwards was the test, thus showing the outlet to be less than two inches in diameter, the limit for possible delivery. In the absence of callipers accurate pelvic measurements were impossible, but it was easily estimated by simple measurements that the iliac crests and anterior spines of opposite sides were so approximated as to indicate the contracted pelvis. Subsequently I made out the inter-crestal measurement to be approximately $8\frac{1}{2}$ inches and the inter-spinous measurement $7\frac{1}{2}$ inches, taking the outside of crests and spines, while the external conjugate I made out to be approximately 6

inches. The diagonal conjugate taken at the time by the usual method as well as I could make out was $4\frac{1}{2}$ inches. I ascertained that the case was a primipara and had been in labour for 17 hours. The pulse was small and weak, being especially so close to the wrist, but felt somewhat stronger a few inches further up. I made up my mind that with such a small outlet to attempt removal of the child even broken up, would be a proceeding of a very difficult, tedious, and prolonged nature, and, even if attained, would end most probably in fatal exhaustion of the mother, seeing that already she was in a weakened condition. I therefore considered Cæsarean section would give the best chance for her life, and I made preparations accordingly for performing the same in a very indifferent light. The abdomen was washed with soap and water, cleansed with perchloride of mercury lotion (1 in 1000), with ol. terebinth as a final application. Towels wrung out of warm lotion (1 in 1000) were placed round the abdomen. The instruments I used were placed in a basin of boiling water, to which was added perchloride lotion 1 in 1000.

The sponges were similarly treated, the only difficulty being the handling of them, which, however, can be done by means of large forceps such as pedicle forceps. My chief difficulty was the absence of skilled assistance inasmuch as I had to place my Assistant Surgeon in charge of the anæsthetic, which I considered the most important post in connection with the case. I had the good fortune to have seen this operation performed last year by Dr. Griffith at Queen Charlotte's Hospital. Wire was then used for suturing the womb, and I made a note that if ever I had to perform the operation, I would use silver wire to close the wound in the womb, inasmuch as it brought the fleshy edges of the incision well into apposition and any of the sutures that did not seem tight enough could be undone and made tighter if necessary. A new supply of silver wire had just been received a day or two before, and so I considered myself fortunate in being so provided.

The steps of the operation, as performed in this case, were shortly as follows: A central incision from below the umbilicus to nearly the pubes was extended upwards afterwards through the umbilicus and terminated at its upper border, and a corresponding incision through the uterine wall made as rapidly as possible. The child was then delivered from the womb breech first in accordance with the presentation, and I attempted, as well as I could, to prevent by means of sponges the escape of fluid by the sides of the uterus into the peritoneal cavity. My chloroformist now remarked that the pulse was very feeble, and I knew therefore that I must hurry the next stage. I removed the placenta and any piece of remaining membrane I found; then by means of forceps, I took a sponge out of the hot,

* The patient has now (October) completely recovered.

Nov. 1900.]

nearly boiling, lotion, and pressed it into the womb and left it there while I turned my attention to the suturing of the uterus. I passed about six silver wire sutures through the uterine wall, avoiding the decidua and leaving the tightening of the same until I had passed them all and had them in position. This I saw was a mistake, for I afterwards found how speedily the hæmorrhage from the uterine wall was checked as soon as I commenced to tighten the sutures, so that the tying of the sutures as they are entered is an important detail and is mentioned in descriptions of the operation, at least in that given by Herman. It will be seen that I had not in the orthodox manner brought the empty womb out of the abdomen to be held by an assistant, but, as a matter of fact, the operation had to be hurried through, inasmuch as Mr. Amirthasawmy, my Assistant Surgeon, had finally warned me that he could not continue to give the patient any more chloroform with safety, and as he is an experienced chloroformist, I knew that this was no false alarm. I therefore ordered him to administer ether in small amount, while I tried to hurriedly finish the operation. I had just then finished the tightening and twisting of the sutures when, to my disgust and dismay, I saw two of my wire sutures break at the twist and gape before my eyes. I hurriedly substituted No. 4 silk and then, wiping the parts with sponges wrung out of lotion, I set about closing the abdominal incision as quickly as possible with grave doubts as to whether the patient would last through the operation; however, she revived considerably under the ether, and I closed the abdominal wound in great haste, with a certain disregard of the peritoneum, making certain simply of getting the stitches in, so as to embrace the whole thickness of the abdominal wall. With more time I might have considered it necessary to do more, but I felt a comforting assurance in the little importance Greig Smith attached to the peritoneum in the suturing of abdominal wounds.

The subsequent progress of the case was as follows: On the first evening the temperature rose to 100.2° F. with pulse 120; $\frac{1}{4}$ gr. morphia hypodermically was given; next morning the temperature was 99°, becoming normal in the evening, with pulse 100; morphia was repeated. The temperature then remained normal until the evening of the 5th day, when it rose to 99.5°, and on the 6th and 7th days it remained above normal, reaching on the latter day 101.2°, and falling to normal the following day and remaining so until the 11th day, when the temperature was 98° and pulse 76. On the 6th day I examined the wound and found the dressing and wound quite dry and union taking place without any suppuration. Subsequently some stitch pus appeared, but disap-

peared on removal of the sutures. The patient, as far as the operation was concerned, was now practically convalescent, but unfortunately on the 12th day she developed an attack of acute pleurisy on the left side, a not uncommon ailment here at this time of year, due to the strong persistent moist wind which blows continuously in the monsoon months, and to which the patient's low condition rendered her peculiarly liable. She however rallied from this after the acute symptoms with attendant fever had lasted five days, but it left the patient very weak with slow pulse of 50 to 60 per minute and a subnormal temperature for several days; and it was not until nearly a month had elapsed from the date of the operation that the patient showed signs of returning strength. The child has been brought up by a wet-nurse, and is doing well. The case was watched carefully in turns by Hospital Assistants Manickam, Muthusawmy Nadar, and Narayana Nair.

CASE OF OVARIOTOMY.

By D. M. DAVIDSON, M.B., C.M.,

MAJOR, I.M.S.,

Civil Surgeon, Mooltan.

HAYAT KHATUN, aged 30 years, was admitted into the Victoria Jubilee Female Hospital, on the 9th March 1900, for ovarian tumour, which she stated began four years before in the right iliac region. She was considerably emaciated. The abdomen was much distended, the distension reaching up to and affecting the epigastric region. She complained of severe pain in the left hypochondrium which prevented sleep. The abdomen presented the irregularly distended appearance of a multilocular ovarian cyst, fluctuation was also found to be interrupted, and the consistence of some of the cysts was greater than that of others.

On the 19th the operation was performed. Numerous adhesions were found, several being as high as the liver. The omentum was found tacked down to the front surface of the tumour over the greater part of its extent.

Owing to the small size of the individual cysts and omental adhesions, the reduction in the size of the tumour by tapping was obtained with difficulty. To facilitate matters, the pedicle was searched for and tied; it was found running from above downwards and inwards, and very narrow.

The tumour was then gently delivered from the abdomen from below. This enabled the omental adhesions to be defined. They were then divided between two sets of ligatures. The transverse colon was adherent to the upper and left side of the tumour opposite the splenic flexure. Fortunately there was just sufficient space to permit a row of ligatures to be applied between the tumour and the bowel. The vessels:

in the omentum were much distended, many of the veins being the size of a small little finger. The patient was very weak when placed in bed, and died at 8 P.M. on the 20th, having practically never overcome the shock of the operation.

The tumour which affected the right ovary weighed 10lbs. The fluid removed could not be measured, as one of the assistants unfortunately poured a lot of water into the vessel into which it had been received.

The interest of the case lies in the excessive omental adhesions and the alternated pedicle. The chief blood supply of the tumour was evidently derived from the adhesions.

Lieut. Fry, I.M.S., 4th Sikhs, very kindly gave me indispensable assistance at the operation.

A CASE OF TRANSPOSITION OF VISCERA.

By J. K. CLOSE, M.D.,

MAJOR, I.M.S.

Civil Surgeon, Moradabad.

I OBSERVED a complete example of this condition while making a *post-mortem* examination for medico-legal purposes.

The heart was on the right side of the chest. The left auricle received the *venæ cavæ* and communicated with the left ventricle by a tricuspid valve; the pulmonary artery arose from the left ventricle, the pulmonary veins emptying into the right auricle. The valve between the right auricle and right ventricle was a bicuspid one. The aorta sprung from the right ventricle and turned to the right, and lay on the right side of the spine, having the vena cava on its left. The right common carotid artery and right subclavian arose separately from the aorta; the left carotid and subclavian from an innominate artery. The recurrent laryngeal nerve wound round the aorta on the right side and the subclavian on the left. The thoracic duct could not be found owing to decomposition, and for the same reason only the larger vessels could be traced. The right bronchus was longer than the left; the left lung being three-lobed and the right two-lobed.

In the abdomen the liver was on the left having the normal number of lobes only transposed. The spleen and pancreas were on the right side and the hollow of the duodenal curve was to the left. The cæcum lay on the left side and the sigmoid on the right. The subject was a man of about forty years of age.

A RHINOPLASTIC OPERATION.

By VINAYAK SUBURAN KELKAR,

1st Class Hospital Assistant, *Athni*.

A WOMAN named Ashama, aged 15 years, a native of Jatt State, was admitted into this dispensary on 15th April 1900, a fortnight after her nose was completely cut off by her husband.

On 16th April a rhinoplastic operation was performed in the following manner:—The patient being put under chloroform, a suitable flap of skin was removed by the scalpel, with a "tail" towards the nose on which it was twisted and brought down and attached to the wound of the nose by means of silk sutures. The margins of the nasal wound were properly pared and adapted to those of the flap before the sutures were applied. The wound was dressed in the usual manner, the nostrils were kept open by tubes of india-rubber for the purpose of respiration and exit of mucus, &c. The bleeding from the wounds on forehead and nose was checked by pressure and styptics. The connection of the flap at the bridge of the nose was cut a fortnight after the operation. The woman was discharged cured on the 21st May.



I am indebted to Mr. Joshi, a veterinary graduate, for his assistance during the operation. The two photographs attached will show the state of the patient before and after the operation.

THE
Indian Medical Gazette.

NOVEMBER, 1900.

MALTA AND ENTERIC FEVERS IN THE
DELHI-HISSAR DISTRICTS.

CERTAIN reports, more or less inaccurate, having got into the papers as to the nature of the fevers which are causing considerable mortality in the districts of Delhi, Hissar and Rohtak, it is well to give the facts as they actually occurred.

The attention of the Sanitary Commissioner of the Punjab having been called to the high death-rate from fevers in these lately famine-stricken districts, he asked the Civil Surgeons of those districts to ascertain if relapsing or famine fever existed among the people. This fever being shown by an examination of the blood for the spirillum to be absent, Colonel Bamber determined to try if enteric fever or Malta fever prevailed among them.

Colonel Bamber providing himself with the necessary apparatus first went to Delhi, and in the Civil Hospital there found two cases of continued fever under charge of Major J. A. Cunningham, I.M.S.; no other cases were forthcoming as the native practitioners (even for the purpose of finding out the nature of the disease from which their patients suffered) were unwilling to produce patients, alleging a dread of the "harmless necessary" needle-prick, but Major Cunningham was able also to bring up a Eurasian who was glad to have his case diagnosed. At Hissar Colonel Bamber was able to obtain blood specimens from three cases, and two more at Rohtak. The specimens from these eight cases were taken to the Pasteur Institute at Kasauli for examination with the following results: Of the three Delhi cases the serum sedimentation tests showed that one of them was Malta fever, one had suffered from both Malta fever and from enteric, and one was negative, nor were the spirilla of relapsing fever obtainable from it. Of the three cases from Hissar, one re-acted strongly to the test for enteric fever and slightly to that for Malta, showing that the patient had suffered recently from enteric and at a former date from Malta fever. The second case re-acted to Malta fever, and the third to enteric. Of the

two cases from Rohtak, one re-acted to the enteric test and the other to the Malta test.

To sum up these results, out of eight cases examined no less than seven gave positive results, results which if they had been diagnosed otherwise would, even five years ago, have simply not been believed. Of these there were three cases of Malta fever simply, two of enteric fever, and two in which the serum tests indicated the previous or present existence of both Malta and enteric fevers.

We congratulate Colonel Bamber on having obtained these results; it is scarcely possible to take any other view than that these fevers exist among the natives of these districts, and if so, probably to a similar extent, at times, in other districts and parts of India, more especially perhaps in famine times.

Colonel Bamber has recommended to Government that all Civil Surgeons in the Punjab be provided with the not very elaborate apparatus for making these blood examinations, and Colonel Hendley in Bengal has issued a circular to the same effect, and we hope that all other administrative officers will do the same. In this way, in a short time, a considerable amount of positive knowledge will be acquired, and it is probable that the new century will have scarcely begun before we have made advances in the differentiation of the fevers of India more than all that the now dying century has done.

We may add that the above tests were performed in the Kasauli Institute, and this furnishes another proof of the vital necessity of such institutions, if we are not to lag behind the rest of the world in the matter of medical progress.

THE ANNUAL REPORTS OF THE LUNATIC
ASYLUMS OF BENGAL, MADRAS AND
THE PUNJAB FOR 1899.

THE blue, red and yellow covers of these reports are almost as varied as the conditions that obtain in the asylums of the three local Governments mentioned. That is what might be expected in a country so backward as India is in regard to both the legislation for, and treatment of, the insane. As time goes on, and as improvements are introduced by degrees, so gradually also will the conditions of the insane in the various presidencies and provinces of India be assimilated. To illustrate these differ-

ences, let us compare what is done to give instruction in mental diseases and training in the treatment of the insane, also let us see what is provided in the way of occupation and amusement.

In the Punjab asylums apparently nothing was done to provide the patients with amusement. In the asylums of Bengal we read that the patients have musical instruments, a small library of vernacular books, cards, pet animals and birds; that *nautches*, sweetmeats and fruits are furnished on festival days, that the quieter patients are taken to visit the Zoological Gardens and the bazar, and that regular walking exercise is insisted on for those that decline work. This is all done on the initiative of the various superintendents; but in the Madras Presidency, we are glad to note that certain native noblemen, men of position and wealth, and others, take a kindly interest in their mentally afflicted fellow countrymen. Two rajahs sent frequent presents of fruit, other notables took a special interest in the asylum inmates, a Parsi opera troupe gave free admissions to selected insanes, and a native dramatic troupe gave a gratuitous performance in the asylum premises. In addition to this mention is made of games, juggling and acrobatic performances, monthly treats of music and light refreshments, a special Christmas treat with the distribution of small presents, chess and cards, domestic pets, and local sight-seeing.

In the Madras asylums gardening and weaving are the chief employments; but we see with pleasure that advantage is taken of the inmates in aiding the asylum staff in all departments, just as is the case in well-conducted European asylums. Corn-grinding, coir yarn-twisting, mat-making, light tin-work, and needlework are also mentioned.

In Bengal asylums the inmates are largely employed in cultivation, dairy-farming, weaving, mustard oil manufacture, dry-earth preparation, needlework and domestic duties. Although no work is compulsory, yet the principle is recognised that the more the inmates can be induced to take up some employment, the quieter and more contented they become. Unfortunately this does not apply with equal force to the European and Eurasian insanes in Bengal, for whom the resources of work and amusement are considerably less than in Madras.

In the Punjab asylums the inmates were put to garden work in only one of the two asylums; manufactures of various kinds are alluded to, but the making of *munj* matting is the only one specified. In the Punjab practically nothing is done for the systematic teaching of mental diseases and their treatment. The same may be said of Bengal, though it is stated that arrangements are going to be made for the training of civil hospital assistants by attaching them on recruitment for a couple of months to asylums. But both in Bengal and the Punjab the teaching and training of asylum attendants is a haphazard business; "warders" or "keepers" they are called, and virtually warders they will remain as long as they are recruited from the present class of men and women with their present pay and prospects, and so long as criminal and non-criminal insanes are herded together. The medical authorities are fully alive to the inferior quality of the asylum attendants, and the Director-General of the Indian Medical Service strikes the right note when he suggests the abolition of all forms of restraint, and he sees no reason why the Indian attendant should not be as much improved as the modern British one. A stumbling-block exists in the association of criminal and non-criminal lunatics, because the former require a different kind of watch and ward for very obvious reasons.

In Madras the Superintendent is also lecturer on mental diseases and gives clinical instruction at the asylum, and his assistant surgeon acts as assistant teacher, both of them drawing special allowances for their teaching work debitable to the Medical College. The list of the asylum staff in Madras compares very favourably with the somewhat meagre staff in the Bengal and Punjab asylums.

In the Punjab there have hitherto been two asylums, one at Lahore, and the other at Delhi. The former has accommodation for 296 persons, and 150 is the capacity of the latter. There has been a steady increase in the population of the Lahore Institution, so much so that there was distinct overcrowding, the total daily average strength having been 298.87 and a maximum of 319 at one time having been reached. The increase at Delhi has also been steady, and the maximum number confined at one time reached within one of the authorised scale, while the

daily average total was 139.96. The question of accommodation in these asylums need no longer cause anxiety, because they have been abolished, and all patients have been transferred during the current year to the new Central Lunatic Asylum for the Punjab at Lahore. With this fresh departure, it is to be hoped, there will be a new *régime* for both *aliénistes* and *aliénés*.

In Bengal, too, there are signs of impending change. The six asylums are to be reduced to four by having a large central lunatic asylum at Berhampur, which will absorb the populations of the present Dullunda, Patna and Berhampur asylums, leaving Bhawanipur (for Europeans), Dacca and Cuttack asylums as before. The question of a central asylum has been on the *tapis* for the past five years, and one good result of the delay has been that the original scheme has been relegated to the limbo of the might-have-beens. The Inspector-General is to be congratulated on having induced Government to desist from the Bandel or Chinsurah project, which was at one time so much in favour. The population of the Bengal asylums is not on the increase, because we find the daily average strength for 1899 was 902.84, which is less than in any of the previous ten years.

In the Madras Presidency there are three asylums, which are situated in Madras, Vizagapatam and Calicut. Of these the first is by far the most important. At present there appears to be no indication of new asylums in prospect, and there seems no need since the accommodation is ample. At the same time we note that numerous additions and improvements have been made, *e.g.*, an isolation section of four blocks, covered passages, a noisy enclosure and dining-shed, &c.

In the Madras Institution the capacity is estimated at 689, whereas 446 was the maximum number on any one day; at Calicut there is accommodation for 133, and the maximum was 81; and at Vizagapatam there was a maximum of 76, while 91 can be received.

(To be continued.)

THE DUBLIN ASYLUM FORM OF BERI-BERI.

WE have, upon more than one occasion, commented upon the strange fact of the occurrence of what was called beri-beri in certain lunatic asylums in the British Isles and in America, and

have noted that, notwithstanding all the resources of modern medical science, observers at home have entirely failed to give even a clue to the causation of this strange disease, a fact that conveys a lesson to those stay-at-home critics who are fond of criticising medical matters in India and the tropics generally.

We here purpose to call attention to a report on the nature of this so-called beri-beri in the Richmond Asylum at Dublin, which has been presented by Dr. A. F. Verschour and Dr. G. Van Ijsselsteyn, of Holland, two distinguished Dutch physicians well acquainted with the disease in the Dutch East Indies.*

The epidemic broke out in the Richmond Asylum in June 1894, increased in violence till October, then rapidly disappeared. In August 1896 a second outbreak occurred, which reached its maximum early in December (113 cases at one time); it then rapidly decreased, only a few cases occurring in January, February and March. The third epidemic began in June 1897, by the attack of a patient who had previously suffered in 1894. In the second and third epidemic several of the attendants were attacked. In the third outbreak 38 patients were attacked who had recovered from previous attacks. At the time of the visit of the Dutch observers there were 42 male and 143 female patients suffering from this disease, as well as six attendants belonging to the asylum.

As regards the clinical symptoms, one point was paid much attention to, *viz.*, that a considerable number of cases began with vomiting and diarrhoea, or vomiting and a rise of temperature. Diarrhoea is known to be not uncommonly a precedent of tropical beri-beri,† but vomiting has usually been noted as a late and ominous symptom. Pains in the legs and chest were constantly complained of, and subjective symptoms of walking as if on felt, formications, pins and needles, burning pains, hot and cold shiverings without fever. Dropped feet appeared early, and the muscles of the abdomen and loins became so weak that the patients were absolutely crippled. In some cases the knee jerks were increased, but in advanced cases they had usually disappeared. The joints, especially of the knees, were relaxed to an

* Translated in the *Dublin Journal of Medical Science*, May and June, 1900.

† Davidson's *Diseases of Warm Climates*, p. 471. Manson.

extraordinary extent, so that the patients could bring their heels against their gluteal regions. The Dutch physicians, on going through the clinical symptoms seen in the Dublin outbreak, admit that it is no easy task to name the disease. What is certain is that they saw a "polyneuritis manifesting itself in an epidemic form." As regards the ætiology, one fact appeared important, viz., the initial vomiting and diarrhœa. This gives the possibility of a toxic agent originating, in the gastro-intestinal canal. Lead was at once thought of, for certain similar cases were found in the Suffolk Asylum in 1895, at a time when lead was found in the drinking water; unfortunately for the lead theory, however, the epidemic reappeared in Suffolk, and this time lead had been carefully got rid of from the water. Nor were the other well-known symptoms of plumbism present—there were no blue-lined gums, no lead colic. Arsenic and alcohol were suspected and dismissed. Food-poison disease as ergotism, pellagra, &c., could be excluded; the food used in the asylum was identical with that used in neighbouring hospitals and workhouses, which had no such cases. Finally, the question remained—was the disease beri-beri? Does an acutely dilated heart *plus* anæsthesia of the legs, *plus* disappearance of the knee-jerk equal beri-beri? The Dutch physicians give as their deliberate opinion that the disease is not beri-beri, that is, the beri-beri of the Far East. They admit that all that they observed may be present in beri-beri, and that no disease presents more varied aspects, but the total impression made on their minds was that the disease they saw in Dublin was not beri-beri. They give the following reasons for this opinion, which is in opposition to that put forward by Manson, who was asked to examine the Dublin cases:—

(1) They never saw in Holland any building infected by beri-beri, though hundreds of patients come home every year from the endemic foci of the disease.

(2) Europeans at first are free of the disease generally, only after they have lived some months in the endemic area do they become predisposed.

(3) Beri-beri chiefly affects men; in the later Dublin outbreaks women suffered chiefly.

(4) Vomiting and diarrhœa, as initial symptoms, were more prominent in the Dublin and Suffolk outbreaks.

(5) The *anæsthesiæ* were different in Dublin—the spots constantly changed their position, altered in intensity or even disappeared within the hour; in the Far East anæsthesia or hyperæsthesia over the whole limb is stated to be the rule, though Manson does not say so definitely.

(6) The disease was, indeed, most prominent in the legs and spared the dorsa of the feet, which is not usual in beri-beri. The œdema too frequently "disappeared rapidly," but this too is noted by Manson, who writes the œdema "may disappear as suddenly," as it came.

(7) It is stated the characteristic "diffuse heart pulsation," was absent in the Dublin cases.

(8) More cases of "dropped wrist" were found in Dublin than is usual in beri-beri, and the marked atrophy of the muscles was more pronounced.

(9) The extreme relaxation of the joints is never met with in beri-beri to the degree it occurred in the Dublin epidemic, though Manson lays emphasis on the relaxed joints.

It will be agreed that the data on which the Dutch observers rely to differentiate the Dublin epidemic from the endemic disease of the East are far from satisfactory. Nor have they been able to find out the cause of the outbreak. In conclusion, we cannot agree with Drs. Verschour and Van Ijsselsteyn that the description of the Dublin epidemic conveys a "totally different impression" from that of the endemic beri-beri of Eastern lands.

LONDON LETTER.

PLAGUE IN GLASGOW.

THE excitement of the hour is the veritable outbreak of plague in the city of Glasgow. The first case came under notice on the 20th of August. It was one of a group which appear to have originated in connection with a "wake" in a crowded tenement in an obscure part of the town. The disease was not identified until after the admission of the patients into hospital; but once suspected bacteriological tests were applied and doubts regarding the nature of the disease were removed. Measures were promptly taken to stamp out the disease. The infected tenement was vacated and thoroughly disinfected; systematic observation was kept on the locality and its inhabitants for the purpose of early detection of new cases; "suspects" were at once isolated;

infected persons rigidly segregated; a prophylactic serum was obtained from Paris and used largely; and rat catchers were employed to destroy the rats in the house and its vicinity. At the same time the sanitary authorities of the city and port were stimulated to special vigilance and energy. The number of cases* which have occurred up to the present time is thirteen; there is one suspected case in addition and 111 persons who have been presumably exposed to infection are kept in isolation. No new case has appeared for several days, and there is every hope that the worst is over and that the disease will not spread further. Quarantine has been established in many foreign ports against arrivals from Glasgow, and it is feared that the commerce of the great Clyde port will suffer somewhat. More or less panic has arisen, which has extended to other ports; but though isolated cases of plague have been met with at the London docks, the measures of inspection and isolation which are habitually practised by the health officer of the port and his executive are so thorough that the probabilities of this or any other infective disease filtering through them are very slight.

FILTH TOLERANCE.

The recently published report of the Sanitary Commissioner with the Government of India has given currency to a term and doctrine which tend to place sanitation in a somewhat awkward plight. The doctrine is, in brief, habituation to filth and immunity against its hurtful effects, in the same manner as habituation to infection is believed to confer immunity against contagia. According to this view a person who has been brought up and lived in cleanliness is at a disadvantage on entering a filthy country or locality as compared with one who has personally or hereditarily grown callous to insanitary conditions and surroundings. This is rather a gruesome thesis and might perhaps be advanced as a plea for leaving people to wallow in their native and congenial grime, unless sanitary reformation could be universally accomplished *per saltum*; but there is fortunately another side to the shield.

SANITARY IMMUNITY.

If filthy habits and surroundings become tolerated and harmless *qua* filth through

* On 29th Sept. the total number of cases was 27.—ED., J.M.G.

habituation, they still retain the prerogative of affording a favourable nidus to sundry infections, more especially to those foreign to the people and place. Immunity may be as efficiently procured by removing of the nidus as by excluding or destroying the contagium. The soil may be rendered barren by sanitation so that the seed even if sown may fail to fructify. It is on this principle that a community or country may obtain its best and surest defence from plague and pestilence, and apart from question of civilization, refinement and general well-being sanitary immunity constitutes a more substantial and hopeful policy than filth-tolerance.

CIRCUMCISION.

The small operation of removing the prepuce in part or in whole is generally resorted to among communities other than Jews and Moslems for surgical reasons, as a curative expedient. Practised as a rite or racial custom the operation of circumcision possesses a different significance and purpose; the advantages of it not being generally understood and realized. These constitute the subject of an interesting editorial in the issue of the *Polyclinic* for September, evidently written by Mr. Jonathan Hutchinson. He claims for the operation that it promotes local cleanliness and prevents irritation resulting from retention of smegma. This retention occurring mostly in boys exercises a disturbing effect on mind and morals, which is best avoided in the young and best prevented by this expedient. The absence of a part subject to various annoying maladies also contributes to comfort in advanced life. It is, however, as a preventive of syphilitic infection that circumcision does most good. There can be no doubt that it does afford protection in this respect. The surface of the glans and of the sulcus becomes epidermic, and the pouch on each side of the frenum is obliterated. Abrasions and cracks are less liable to occur in coition and retention of noxious material in contact with the parts is less likely to happen. As a matter of fact the circumcised suffer less from syphilis than the uncircumcised. This is a very important advantage, and not to be gainsaid while human nature and human habits remain as they are. The moral effect of circumcision is, on the whole, the writer contends, beneficial. If it dulls the pleasure of sexual intercourse, it also blunts

those physical sensations and incitements to voluptuous thoughts which drive men to venereal indulgence and are apt to weaken sexual control.

VENEREAL DISEASE IN THE ARMY.

Colonel J. Lane Notter, Professor of Military Hygiene, Netley, read at the Paris Medical Congress an important paper on the past and present prevalence of venereal disease in the army. He showed that in home stations, after the repeal of the Contagious Diseases Act in 1886, there was for a time a slight increase followed by a decline, which has been continuous and progressive. This he attributes to the improved education both of soldiers and prostitutes, the diminution of drunkenness, the development of other tastes and encouragement of other pursuits, and to the increase of self-restraint caused by various influences making for an elevation of their intellectual and moral tone. This is a satisfactory judgment founded on a careful and extensive induction. In India also some improvement is evidenced by the statistics of recent years. No doubt the same influences which have wrought a change for the better at home have also operated in some measure favourably abroad. The Cantonment regulation of 1897 is credited with some share in producing the Indian reduction. On the general question of prevention Colonel Notter is opposed to stringent regulations and advocates education, the encouragement of physical sports, amusements, occupation and intellectual pursuits and the inculcation of self-restraint.

THE CHAIR OF MILITARY HYGIENE AT NETLEY.

Professor Notter who has held this chair with great advantage to the service and public and distinction to himself for a period of thirteen years has tendered his resignation, which has been accepted. He has been appointed to a Commission composed of himself, Professor W. J. Simpson and Major Bruce, R.A.M.C., for the purpose of investigating the causation of enteric fever and dysentery in South Africa, and Major Firth, R.A.M.C., has been selected to succeed him.

6th September 1900.

K. McL.

Current Topics.

NOTICE TO CONTRIBUTORS.

AN admirable suggestion has been made to us by an old contributor, which we think it would be an improvement to adopt. This is that space

should be reserved every month for brief notes of cases or clinical memoranda, something on the lines of the clinical "Memoranda" in the *British Medical Journal*. As our correspondent points out there are lots of little clinical or surgical points running to waste for want of record, such cases might not be worth the writing of a formal paper upon, but could with advantage be recorded in short notes, of say, 30 or 40 lines.

We shall be glad to adopt the suggestion in future numbers, and we hope that our readers will forward us such memoranda.

We may add that we are always glad to get criticisms from our readers. Our object is to make the *Gazette* as interesting and as useful to as many as possible.

A MALARIA PREVENTION EXPERIMENT IN CALCUTTA.

IN our last issue we gave an account of Dr. Neild Cook's researches into the prevalence of the anopheles in Calcutta and its connection with malaria. We are now enabled to report, by the kindness of Dr. Cook, a further interesting experiment in the prevention of malaria by attempting to destroy the mosquito. Dr. Cook informs us that, soon after the rains set in, the anopheles disappeared almost entirely from the tanks where it had been found during the dry weather, but, on the other hand, it appeared with much greater prevalence in rain-water puddles in nearly all parts of the town. In two cases of fever in good European houses the larvæ were found in close proximity to them.

The most interesting experiment, however, is that carried out by Dr. Cook and Captain Rogers, I.M.S., which is briefly as follows:—

The Port Commissioners and Messrs. Bird & Co. complained that the work of coaling at the docks was seriously interfered with by an epidemic of fever among their coolies. Dr. Cook and Captain Rogers visited the lines of these coolies and found that they were very well housed and that they were drinking filtered water, yet the fever which prevailed among them was of a distinctly malarial type. A ditch of stagnant water was found to run the whole length of the lines at a distance of only a few feet. In this ditch were found plenty of the anopheles larvæ. Messrs. Bird & Co. provided a large barrel of tar, and the ditch was liberally treated with tar under Dr. Cook's own supervision on the 14th August, and again on August 19th and 26th. However, we regret to say that the use of the tar had little or no effect either on the breeding of the anopheles or in preventing the cases of fever, for from a return of the number of cases of fever made by Messrs. Bird & Co., which is now before us, it is clear that there was no falling off in the number of fever cases; for the average number of

cases for 29 days before the first application of tar was 26 daily, and since that date the average number was 33, and after the second application of the tar 23 cases daily, so that it cannot be said to have had much appreciable effect. Nor had the tar had any effect in reducing the numbers of the anopheles larvæ, for Captain Rogers reports that on his visit to see the effect he found a certain amount of the tar to be seen as a fine film in portions of the drain, and only a few anopheles, but when he visited the same place, three days later, he found not many larvæ in the upper *untreated* part of the drain, but to his surprise there were more in the part which had been tarred. This surprising result Captain Rogers thinks may be due to the fact that this portion had a larger number of likely looking pools, and also to the absence of small frogs from it, which were probably driven out by the tar, as there were plenty of them in the higher-up portions of the ditch. Dr. Rogers thinks that when the rains become less, the tar may have a more destructive effect.

Such a result is certainly disappointing, as we had been led to expect much from tar as a larvicide.

Such experiments are, however, very useful, and many more should be reported; it is only in this way that we can ever arrive at any satisfactory solution of this question, which is perhaps not quite so simple as we have been led to expect. Since writing the above, Dr. Cook informs us that he again visited these coolie lines on 1st October, and found that the anopheles had practically disappeared, and the fever cases diminished to 16 a day; the coolies themselves believed that the fever was much less. In another village near, a severe outbreak of fever had prevailed, and anopheles were found in every pool. Since the flood, due to the cyclone in Calcutta, the fever has gone and the anopheles also; it would appear that the floods washed away and destroyed the anopheles larvæ, though one can hardly expect that none of them have escaped, and the floods have left plenty of likely pools for them to breed in.

MALARIA OR BERI-BERI AT RAJAHMUNDRI.

THERE is one paragraph in the recent report of the Sanitary Commissioner of Madras which requires a somewhat detailed notice. Our readers may remember that we once* referred to the work done by Captain Fearnside, I.M.S., at Rajahmundri, and how that he had shown to our satisfaction that the disease hitherto considered to be beri-beri was none other than a cachectic condition due to malaria and the ravages of the ankylostoma parasite. In the report to which we have referred, Lieutenant-Colonel King, I.M.S., the Sanitary Commissioner, writes

as if he understood Captain Fearnside to say that beri-beri was due to malaria. We need hardly tell our readers that Captain Fearnside never could possibly have meant anything so absurd, and most certainly when we read his pamphlet on the sickness in the jail, we understood clearly that what Captain Fearnside meant was that the cases which were the cause of so much sickness and mortality were *not* beri-beri, in any sense of the word, though they had been for years been *wrongly diagnosed as such*, but they were simply cases of advanced malarial cachexia, complicated, in a large number of cases, by the presence of the ankylostoma parasite. We are at a loss to understand how any other meaning could be read into his clear and well written report. Colonel King, however, has examined a lot of cases (not in the jail) in the neighbourhood of Rajahmundri, and has come to a conclusion which will surprise nobody, and that is, that beri-beri in Madras is not due to malaria. Nobody that we have ever heard of ever said it was. It seems to us that here again the word "beri-beri" has been a fertile source of confusion, as it has been in other parts of India, and we are strongly inclined to venture the opinion that *it is extremely doubtful if endemic beri-beri does exist (to any extent) in the Northern Circars*, though its existence there has been affirmed since the days of Malcomson in 1835. We are inclined to this opinion from a consideration of the following facts; in the first place, Captain Fearnside has shown very clearly, in more than one article in these columns, that the very severest forms of malaria have certainly existed in the Rajahmundri Jail, and moreover his paper, read at the recent British Medical Association meeting and published in our columns in October, has equally clearly shown that the ankylostoma parasite is extremely prevalent in the jail, no less than 70 per cent. of the convicts being more or less affected with the worm. Here, then, we have the very conditions existing which have for years proved a stumbling-block in other parts of India. Our columns for the past six years have testified to the existence of this combination of the worm and malaria in Assam and in Ceylon, and it is very significant that in both these countries the term "beri-beri" was formerly erroneously used to describe cases in Ceylon, and in Assam which are extremely similar to those in Rajahmundri. The work of Giles, Dobson, Ronald Ross, Rogers, and the late Dr. Hayman Thornhill has clearly shown that the view that these cases were "beri-beri" is utterly erroneous, and it seems to us what those writers have done for Assam and Ceylon, the same has been done for Rajahmundri by Captain Fearnside. Are we now to go back to the more than mediæval darkness which surrounded this question before the writers above mentioned cleared the matter up for ever? Is it any wonder that Dr. Manson refers to this.

* I. M. G., June 1899, p. 211.

confusion as a reproach to Indian pathology? (See *Tropical Diseases*, new edition, p. 267.)

We, of course, do not mean to say that the form of endemic neuritis, known by the grotesque name of "beri-beri" is unknown in Madras; we have not sufficient evidence to make such a statement, but it behoves all those who think they come across cases of beri-beri to report them, paying attention not to œdema or anæmia (the latter is not a symptom of beri-beri), but to the condition of the heart and the peripheral nerves which alone are characteristic of the disease. It is also a strange fact that while ankylostoma has been found to be so prevalent in the jail at Rajahmundry, no notice of its existence appears to have been taken in the outside population. We consider that Captain Fearnside is entitled to the greatest credit for having rescued the diseases of his prisoners from the Cimmerian darkness in which they have for years been shrouded.

OPERATIONS IN THE VARIOUS PROVINCES.

THE following table gives a list of some of the most important operations done in the various provinces. It is interesting in many ways. The total operations as recorded according to the "selected list" now in vogue, do not differ so very widely, considering the number of

tion the North-West Provinces are far and away first, the Punjab next, then Bengal and then, at a great interval, Madras. The fact that only 228 cataracts were done in mofussil dispensaries in Madras, while the other three Provinces count them by the thousand must mean that the disease prevails to a much lesser extent; why this should be so it is impossible to say. Then, again, stone; its great rarity in Madras is also emphasised by these figures, as well as its commonness in the Punjab. Why Madras should have so few ovariectomies is not clear; while for some reason the total of "obstetric operations" is far greater than that of other provinces. It may be noted that *only case of appendicitis was operated on in all India*. We some time ago asked a question about this disease in India, and pointed out how rare it is. One case out of over half a million operations in four large provinces surely proves rarity, yet our statement was recently challenged by a Surgeon now in Calcutta. Bengal takes a high place for operations of the first magnitude, as abdominal sections, splenectomy, and enteroraphy. It is curious that there were no cases of Cæsarian section or of Porro's operation in Madras, while the North-West Provinces record eleven. Madras (excluding City of Madras) again has only four ovariectomies to its credit, while the North-West Provinces has twenty-six, and Bengal and Punjab eleven and

Name of operation.	Madras.	N.-W. P.	Bengal.	Punjab.	Rajputana.	Calcutta.	Madras city.
Total operations	121,261	180,190	145,579	170,051	64,745	24,947	16,243
Amputations	369	486	556	275	138	221	130
Trephining	4	9	10	5	.....	6	4
Harelip	14	70	22	56	5	6	4
Rhinoplasty	5	204	5	30	15	3	.....
Ranula	59	75	63	56	28	6	2
Cataract	228	5,778	2,682	4,867	1,653	387	1,063
Excision of breast	12	45	13	26	5	7	12
Abscess of liver	26	37	111	29	4	67	12
Operation on kidneys	1	1	.....	2	.....	2	1
For hernia	210	267	207	145	25	47	97
For fistula in ano	236	243	374	129	49	62	59
For piles	159	180	127	176	76	78	53
Lithotomy	28	445	160	269	72	4	7
Litholapaxy	3	446	102	1,850	98	9	2
For hydrocele	2,739	11,747	5,277	359	111	1,888	1,232
Castration	21	21	11	6	1	16	27
Ovariectomy and removal of uterine appendages	4	26	11	16	2	17	29
Obstetric operations	1,127	267	142	167	53	463	543
Abdominal sections	9	20	20	16	2	35	20
Splenectomy	.....	.....	3	.....	.....	2	.....
Cholecystotomy	1	.....	1	.....	.....	2	.....
Appendicitis	.....	.....	1	.....	.....	.....	.....
Enteroraphy	4	5	11	4	.....	1	3
Intest. obstruction	6	9	5	3	.....	.....	6
Colotomy	1	1	2	.....	.....	.....	3
Cæsarian section	.....	4	.....	3	1	.....	.....
Porro's operation	.....	7	.....	.....	.....	1	.....

hospitals and the populations, but there is considerable divergence in the number of cases operated on for various diseases,—which is a fair index of the prevalence of the diseases in each province. Take cataract; in this opera-

sixteen, respectively. Operations for stone in the kidney are rare in all Provinces. The number of rhinoplastic operations in the North-West Provinces is enormously in excess of that of all other Provinces.

PROFESSOR WRIGHT ON SCURVY.

THE following extract from a recent short paper by Prof. A. E. Wright of Netley (*Lancet*, August 25th) is worth quoting, as it sums up briefly his views on scurvy, which differ vastly from the ordinary views on the subject. They are introductory to a series of cases of scurvy recently examined at Netley in the persons of soldiers who had formed part of the garrison of Ladysmith. The association of dysenteric stools with the scurvy in some cases is important. The treatment consisted in large doses of lactate of soda, or soda bicarbonate or citrate of potash.

"The scorbutic condition is a pathological condition which is induced by a dietary consisting of meat and cereals to the exclusion of green vegetables, tubers, and fruits. Inasmuch as the food-stuffs which are excluded from the dietary in question are food-stuffs which contain an excess of bases over mineral acids, while the food-stuffs (meat and cereals) which remain are food-stuffs which contain a large excess of mineral acids over bases, it is obvious that the scorbutic condition is one which supervenes upon the ingestion of a considerable excess of mineral acids over bases. It would, in view of this consideration, seem probable that scurvy is a condition of acid intoxication, very similar to the acid intoxication which can be experimentally produced in *hervivora* by the ingestion of a surplus of mineral acids. The theory that scurvy is essentially a condition of acid intoxication would appear to be in harmony with the circumstance that the rapidity with which the scorbutic condition supervenes depends, apparently, upon the degree to which the mineral acids are in excess in the dietary. The condition is apparently more rapidly superinduced by a dietary of corned meat (*i.e.*, meat which has been rendered hyperacid by the removal in the process of corning of the alkaline salts of the blood and lymph) than by a dietary of fresh meat (*i.e.*, meat which still contains these alkaline salts). Similarly infantile scurvy would seem to be generally dependent upon the substitution of more acid food-stuffs (preparations of cereals sold under the designation of "infant foods") for the less acid food stuff, milk. Justification for the identification of scurvy with a condition of acid intoxication would appear to be afforded also by the consideration that the scorbutic condition is remedied or alleviated by the addition to the scorbutic dietary of any one of a whole series of different substances—tubers, green vegetables, decoctions of leaves and growing shoots, blood (used for this purpose by the Laps), fruits, and fruit juices—substances which have apparently in common only the circumstance that they all contain an excess of bases over mineral acids. It was pointed out in the conclusion of the paper whose argument has just been summarised that, given the correctness of the above view of the origin and nature of scurvy, the proper prophylaxis and treatment of the condition would consist in the administration of salts of oxidisable organic acids, inasmuch as such treatment would lead by the most direct means to the retention or restoration of the normal alkalinity of the blood."

THE SUCCESS OF OPERATIONS FOR LIVER ABSCESS.

IN his interesting paper on liver abscess (*British Medical Journal*, September 1st) Mr. Johnson Smith, of the Seaman's Hospital, Greenwich, gives incidentally some figures which enable us to estimate the mortality from the operation. Malbot, a French Surgeon in Algeria, published 19 cases, 8 of which were

treated by transpleural incision and 11 by laparotomy, with a total mortality of 33 per cent.

The mortality of course almost entirely depends upon the state of the patient when seen by the Surgeon; a single "tropical" abscess early operated on has a good prognosis, but the same will not apply to the cases who seek for relief at the public hospitals in India, too often worn out and exhausted by septic or hectic fever. The following figures, however, give the results as taken from the Annual Hospital Reports for 1899:—

	Cases.	Cured.	Relieved.	Discharged otherwise.	Died.	Remaining.
Bengal	106	58	15	7	23	3
Calcutta	70	35	4	...	27	4
N-W. Provinces and Oudh	38	17	4	5	9	3
Madras	26	15	4	3	4	...
Madras City	13	4	1	1	6	1
Assam	9	7	...	...	2	...
Punjab	29	9	9	5	5	...

It is uncertain what significance is to be attached to the terms "discharged otherwise" and "relieved," but we are on safer ground when we look only at the columns of "cases" and "cured." If then we deduct the 11 cases 'remaining' from the 291 cases we have 280 cases operated on in which only 145, or just over 50 per cent., can be returned as cured. Fifty per cent. then represents the success of this operation in public hospitals on all forms of liver abscess. The statistics quoted by Manson (*New Ed*, p. 390) gives for Algiers and Egypt a mortality of from 80 to 76 per cent.

HYDROCELE IN INDIA.

THE subject of Hydrocele in India must ever have a great historical interest for the medical services in India, as it is well-known that WILLIAM HAMILTON obtained the famous FIRMAN for the Honorable Company for curing the Emperor Farrucksher at Delhi in 1715 of this complaint, but of recent years little or nothing has been written about the causation of this extremely common affection. Recently we estimated that about 8 per cent. of male prisoners in Bhagulpur Central Jail were affected with hydrocele. It may be more in other provinces. Few will nowadays accede to Sir Joseph Fayrer's view that hydrocele is an expression of malarial cachexia (*Clinical Observations*, &c, p. 513). One of the most recent writers on genito-urinary diseases, Dr. Frank Lydston, says that it is due to a "low form of inflammation from slight injury, probably often forgotten;" the same writer states that it is said to affect ten per cent. of the male adults of Brazil. The relaxed and pendulous scrotum of inhabitants of

hot climates is doubtless somewhat more liable to injury than in the case of dwellers in cold countries, but this is scarcely the whole of the explanation. The following table illustrates at once the relative prevalence and the different methods of operation in vogue in several provinces of India. The figures refer to the year 1899 only:—

Table.

	Tapping.		Tapping with injection.		Incision.		Excision.		Total.	
	Cases.	Cured.	Cases.	Cured.	Cases.	Cured.	Cases.	Cured.	Cases.	Cured.
Calcutta	1,418	600	411	389	13	13	32	32	1,874	1,034
Bengal ...	4,018	2,181	1,180	1,116	51	48	36	34	5,285	3,349
N.-W. P. & O. ...	9,855	1,611	673	530	331	319	77	72	10,936	2,532
Punjab ...	236	114	122	96	1	1	...	...	359	211
Assam ...	92	44	17	17	...	...	1	1	110	62

We can hardly accept this large total of cures from simple tapping, nor is it quite clear how Assam has such a large percentage of cures. The figures for the other operations in other provinces probably fairly represent the high efficiency of the incision and excision methods of operating. The low figures for the Punjab are very remarkable; why should the Punjab—in other operations well to the fore—have only a few hundred hydrocele cases when Bengal and the N.-W. Provinces count them in thousands? This apparently points to some factor in the etiology of hydrocele, which is more active in other Provinces than in the Punjab. Madras returns 2,739 cases, but they are not included in the above table, because the operations are all grouped under one heading only.

Can any of our readers throw any light on these figures, or explain the comparative rarity of this complaint in the Punjab?

THE BACILLUS OF PHILIPPINE DYSENTERY.

THE special report on Dysentery by Dr. Strong of the First Reserve Hospital in Manila. is published (*Journal of American Medical Association*, 25th Augt.) based upon 1,328 cases observed there. The author divides the 111 fatal cases on which *post-mortem* examinations were made into two distinct types: (1) an acute specific dysentery due to a bacillus which has been isolated, and (2) chronic dysentery due to an amoeba. The first type is clinically characterised by acute onset and an abrupt termination either by death (in four to fifteen days) or by early improvement and recovery, or by passing into a subacute and prolonged stage. The "amoebic" form is marked by exacerbations and intermissions of the

diarrhoea with a tendency to chronicity and frequently abscess of the liver.

The bacillus of the acute form is apparently identical with that described by Shiga in Japanese dysentery and by Flexner in dysentery in the Philippines; we have previously referred to both of these. Most of us will agree that the clinical symptoms of dysentery, as described in the Philippines, differ not at all from forms familiar in India; in fact we have over and over again had in our charge for weeks cases of chronic relapsing dysentery in Natives which exactly answered to the clinical description given by Lafleur (in Allbutt's System), except in one important particular, and that is that they were never followed by liver abscess.

Some bacteriological work in connection with dysentery is badly needed at present in India. Another admirable article on the bacilli of dysentery appears in the *Philadelphia Medical Journal* of September 1st, which we hope to notice later on. It is by Dr. Simon Flexner.

COLONEL J. DUKE'S PAMPHLET ON CHOLERA PREVENTION.

WE have much pleasure in calling attention to this pamphlet drawn up by Colonel Duke, I.M.S., while P. M. O. of the Punjab Frontier Force. It has also the advantage of having been revised by Mr. Hankin.

When one compares the plain and simple directions in this pamphlet with the much that was mysterious in that volume called "*Cholera, and What can the State do to prevent it?*" one must be struck with the fact that we are advancing. In the older book all is unknown and mysterious; in this pamphlet the instructions are clear and explicit. Attention is first called to the microbe, and the fact that it can be destroyed by boiling the drinking water, then comes practical instructions for the disinfection of wells and other sources of drinking water. A useful rough rule is given to add one ounce of permanganate for every three feet deep of water in a well.

For wells in cantonments which can be more thoroughly supervised, a new method is described, which has been proposed by Mr. Hankin. This consists in adding first about 5lb. of commercial hydrochloric acid to the well, then after mixing to add the permanganate immediately; the chemical action of the two substances liberates nascent chlorine ozone, and it is believed that the resultant antiseptic is strong enough to kill even the enteric microbe. This effect of hydrochloric acid in intensifying the disinfectant power of the permanganate was, we understand, discovered first by Kronig and Paul in 1897, who, however, suggested it as a means of disinfecting the hands. We believe we have to thank Mr. Hankin for its application to the disinfection

of wells. As commercial hydrochloric acid costs only a few annas a pound, the plan is one to be strongly recommended. The pamphlet gives also full instructions as to the disinfection of *mussacks*, *dhols* and *pakals*, which are easily cleaned with a few drachms of the permanganate. The danger of using old earthen vessels is insisted upon, and clear and explicit directions are given for the disinfection of camps, barracks, pools, latrines, and for the destruction of cholera dejecta. The last page gives a lot of simple hints for the keeping clean of our cookhouses, and we are again warned against that fiend of darkness the *masalchi* and his filthy mops.

We are glad to see a pamphlet which so clearly puts before us the value of the permanganate method of disinfection, the only point on which we would still more strongly insist is the absolute necessity of well-permanganating being done under direct European supervision; if we entrust it to other agency, we may be sure that where ignorant prejudice is strong, it will prove too strong for our emissary, who may, however, report a large number of wells disinfected. We are glad to know that in places where the permanganate method has been much used, the people are beginning to learn for themselves its value, and to cease to look upon it with unfavourable eyes, but till this wiser feeling has grown stronger, we cannot too clearly insist upon the necessity of European supervision. We may add that this pamphlet is to be obtained at the P. F. F. Press, Abbottabad, Punjab, at the cost of three annas.

HÆMORRHOIDS IN INDIA.

THOUGH it is probably true that piles is a much more common complaint in India than in Europe, yet the statistics of operations for piles by no means would proclaim the fact. This is probably due to the disinclination of Natives of India to all rectal operations, and in part probably to the large trade done by a special class of quacks or "pile curers," whose advertisements are to be seen in every bazar.

The following figures are taken from the Annual Reports for 1899, and illustrate the different operations most in vogue in the various provinces.

	By injection.	Ligature.	Excision.	Cautery.	Crushing.
Punjab	2	125	43	6	...
N.-W. P. and Oudh.	1	58	87	33	1
Bengal	...	41	77	9	...
Assam	...	9	2	...	...
Calcutta	...	no details	as to operation	...	...
Madras (Dist)	159	" "	" "	...	...
Madras (city)	53	" "	" "	...	...

KEEGAN'S ADVICE TO OPERATORS ON STONE,

In the course of a letter on our Special Stone number Dr. Keegan writes as follows:—

"The question which we Indian Surgeons have now to solve is, what is the best method of dealing with very large and very hard *uncomplicated* stones, which cannot be dealt with by litholapaxy pure and simple. I think that such stones should be treated by perineal lithotrity, Cadge and others in England favour suprapubic lithotomy for such stones. I think they are wrong. The question, however, can only be decided by experience, and therefore for some years to come all operations for such calculi in India, whether suprapubic or perineal, should be reported as a matter of duty in the columns of the *Indian Medical Gazette*. The ages of the patient, the weight and character of the stone, and the reasons for resorting to suprapubic lithotomy or perineal lithotrity, as the case may be, with results should be faithfully reported, and in five years' time we should have collected sufficient data, to base a just conclusion on this very important point in the treatment of stone in the bladder."

We need hardly say that we shall be glad to publish such cases. It may be noted that the question no longer is the merits of litholapaxy for ordinary stones; this has been settled by the accumulated weight of Indian experience; the question now is the proper treatment of special cases of very hard or very large stones.

THE SIGMOIDOSCOPE.

IN India we have much reason to know a good deal about diseases of the bowels, but we are far from the state that a very refined specialism has brought some of our American contemporaries to. An interesting note in a recent issue of the *Medical Chronicle* sums up some of the work done since the introduction of the sigmoidoscope or long specula into the diagnosis of intestinal diseases.

Morning diarrhoea, according to Tuttle, is always due to some organic disease of the rectum, sigmoid or descending colon, cancer, polypus, papilloma, ulceration or catarrh, and mucous diarrhoea is due to a follicular inflammation of the sigmoid flexure and colon, and is often accompanied by an atrophic catarrh of the mucous membrane.

J. M. Mathews (*American Medical Quarterly*) describes the diseases of the sigmoid flexure, he states that the part is very subject to congestion as a result of constipation. The symptoms are discharges of mucus frequently tinged with blood, aching pain in the back, sometimes radiating to the thigh, and frequent desire to go to stool. This condition is generally diagnosed as dysentery or catarrh of the bowel. The treatment he recommends is copious injections, containing boric or carbolic acid, or if there is

no improvement in a week he advises the injection of fluid hydragis, half to four ounces diluted at bed-time.

CACODYLIC MEDICATION.

SOME TIME ago attention was called in our Current Literature column to the use of the cacodylate of sodium. As it is probable that not much is known of this new departure in therapeutics, it may be worth while briefly referring to a recent lecture by Dr. W. Ewart, on the subject in the *Polyclinic* (September, 1900). The sodium cacodylate contains no less than 46 per cent. by weight of arsenic, and its characteristic is its great solubility, and relative freedom from irritating and poisonous qualities. Arsenic is a drug which is useful in many conditions, and in this form it promises to have a much more extensive field of action. In diluted solutions cacodylate is well tolerated by the stomach; it is too hygroscopic to be prescribed in pills, unless specially prepared in half grain pills. These are given three or four times a day. The drug is also much used on the continent in the form of a rectal injection, half grain in a few drachms of water. It may also be used hypodermically ($\frac{1}{2}$ grain in 10 m. of water) for an initial dose, which may be increased to one grain or more. This is considered the best method in chorea, pernicious anæmia or Graves' disease.

THE photographs of cases of yaws in India, which appeared originally in the *Indian Medical Gazette* have been presented by Dr. A. Powell to the museum of the new Polyclinic in London.

THE *American Journal of Medical Sciences* (September 1900) reports a splendid case of ligature of the abdominal aorta just below the diaphragm by W. W. Keen, the Professor of Surgery, Jefferson College, Philadelphia. The disease necessitating operation was aneurism. The patient survived for no less than 48 days. The operation lasted 1 hour 25 minutes, and 5 oz. of ether were used. The great artery was tied with four strands of disinfected floss silk. Gelatine solution was also injected into the tumour. The patient suffered from fever after some weeks, and the malarial parasite was discovered in his blood.

Up to this, the last year of the century, there have only been recorded 13 cases of this formidable operation, the best known cases being that by Sir Ashley Cooper, in 1817; by Murray, of Cape Town, in 1834; by Sir William Stokes, of Dublin (who died recently in Natal), in 1869; by Czerny two cases, one being on a soldier in the Franco-German War, by Mr. Milton of Cairo, and in January 1900 by Professor Tillaux of Paris. It is remarkable that none of the first

eleven cases survived more than a limited number of hours, the longest time being Watson's case in 1869, who survived 65 hours, whereas the last two cases, those by Keen and Tillaux, survived 48 days and 39 days. It is also worth noting that in the last case (Tillaux) the ligature was placed upon the aorta above the bifurcation instead of on the common iliac as was supposed.

AS we go to press we have received a copy of the "General Medical History of Rajputana," by Colonel T. H. Hendley, C.I.E., I.M.S., and a "Medico-Topographical Account of Ajmere," by Lieutenant-Colonel P. Durrell Pank, I.M.S., and Lieutenant-Colonel D. French Mullen, I.M.S. We hope to notice both these interesting volumes in an early issue.

THE Liverpool Tropical School Yellow Fever Expedition in a preliminary note state that the suggestion made twenty years ago by Dr. Finlay, that yellow fever is conveyed by mosquito is "more plausible than might be anticipated."

THE experience of the medical officers of the Imperial Yeomanry Hospital in South Africa is that "both ipecacuanha and magnesium sulphate have a specific action in dysentery." They believe that ipecacuanha is the more efficacious, "for we have seen cases cured by ipecacuanha which resisted the magnesium sulphate." Demetised ipecacuanha is "not so valuable as ordinary ipecacuanha," and its use is not recommended.

In our experience magnesium or sodium sulphate will cure rapidly all cases in which the disease has not gone so far as ulceration.

THE Annual Report of the Sanitary Commissioner with the Government of India may be expected much earlier than usual this year, probably in December. An interesting feature will be a note on the differentiation of the fevers of India.

A RECENT number of *The Lancet* was—well—not improved by the exhibition of several photographs of plague cases. They had not even the merit of being useful, they were certainly not ornamental.

THE plague in Glasgow is making the people at home realise it in a way they never dreamt of before. It is satisfactory to see that so far no opposition is reported to segregation, but wait till the Glasgow folk become more used to the disease. It is strange to hear of plague cases being sent to hospital as 'enteric.' As in Bombay

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in 1896 the plague seems to have existed in Glasgow two months before it was recognised, and that too in spite of the fact that plague is now not an unknown and forgotten disease, as it was in 1896, but a widespread pandemic, and every medical paper in Europe has contained dozens of articles on the disease. Such things might be remembered by English critics when they often ignorantly criticise matters Indian.

MR. J. CANTLIE is bringing out a book on plague.

WE shall be glad if some of our readers will try the liver treatment of night-blindness and inform us of the results.

WE acknowledge receipt of a pamphlet on KURKA's "Stone Filter System," which claims to be a successful method of filtration on a large scale. The address is R. Kurka, Frankfurt-on-Maine, Germany. We will notice it hereafter.

UP to 1st September 1900, no less than one million nine hundred and thirty-six thousand doses of Mr. Haffkine's anti-plague vaccine had been issued from the Research Laboratory, Bombay.

OVER 200,000 persons have been inoculated in Bombay in the past two years.

THE Bengal Plague Commission is dissolved in Government order, dated 17th September 1900.

THE *British Medical Journal* of 18th August and the *Practitioner* for September have written in high praise of our special "Stone" number, and the *Journal of the American Medical Association* devoted a leading article to a critical analysis of the Indian statistics, and admitted that they made out a very strong case for litholapaxy as the operation of election.

A CASE of enteric fever in a Native has recently occurred in Bhagalpur Central Jail. The serum was found to re-act completely to the typhoid bacillus by Captain G. Lamb, I.M.S., at the Bombay Laboratory.

WE can promise our readers some interesting controversial matter in our December issue; e.g., Major Ronald Ross will reply to the recent paper by Captain L. Rogers, I.M.S., on malaria in Calcutta, and Mr. Herbert Milton of Cairo sends us a valuable criticism of certain statements made by some writers in the special "Stone" number.

Reviews.

Injuries to the Eye in their Medico-Legal Aspect.—By S. BAUDRY, M.D., Professor in the Faculty of Medicine, University of Lille, France, etc. Translated from the original by ALFRED JAMES OSTHEIMER, JR., M.D., of Philadelphia, Pa. Revised and edited by CHARLES A. OLIVER, A.M., M.D. THE F. A. DAVIS CO., PUBLISHERS, 1914-16, Cherry St., Philadelphia, Pa.

THIS small work, which is a translation of the second French edition, is designed to meet the requirements of ophthalmic surgeons who may be called upon to state in evidence the cause, nature and consequences of injuries to the eye received by workers in factories, quarries and other industrial occupations. The varieties of such injuries are carefully and concisely described in the first two portions of the book and are treated especially from a prognostic standpoint. Numerous cases illustrating the difficulties likely to be encountered are related. Part 3 deals comprehensively with simulated or exaggerated affections of the eye and the best means of recognising them. Part 4 deals with medico-legal expert testimony and is adapted to the American Law Courts. The style of the author is vigorous and clear, and the little work, with its complete bibliography and index, should prove useful to those for whom it is intended.

The Typhoid Bacillus and Typhoid Fever.—By P. HORTON-SMITH, M.A., M.D., F.R.C.P. London: J. & A. CHURCHILL, 1900. Price 2s. 6d.

THIS is merely a reprint in book form of the *Goulstonian Lectures*, three in number, delivered this year. They appeared in the issues of *The Lancet* for March 24th and 31st, and April 14th. An epitome of the first two lectures was given at pp. 276, 277 of *The Indian Medical Gazette* for July. The last lecture deals with the agglutinating reaction, its history, technique, persistence and prognosis. Various problems concerning the nature and mechanism of agglutination, the formation of agglutinins and their relations to lysines, are ably discussed. The author adduces striking evidence regarding the marvellous efficacy of urotropin in typhoid bacilluria and cystitis. So strongly is he convinced of this that he goes the length of advocating its routine use in doses of ten grains thrice daily in all cases of typhoid fever, from start to finish, and for three weeks later.

It is unfortunate that this brochure is printed in the rather trying type affected by *The Lancet* in their reprints, and the specimen copy sent to us has been so carelessly bound that pp. 33 to 48 have been omitted altogether, whereas pp. 17 to 32 appear twice over, and the binding is so insecure that some pages dropped out on first perusal.

University Medical Magazine.

THE University under reference is that of Pennsylvania, and volume xiii is practically a new series under new management. The May number is the third of this volume, and the character of its articles is mainly surgical. Dr. Hirst, writing on coccygodynia, describes ten of his cases in which excision was required. Dr. Kelly has an interesting paper on a comparatively uncommon subject, tumors of the vermiform appendix. Dr. Davis contributes some successful cases of operation for perforation in typhoid fever, and gives an instructive summary of his experience. The same may be said of Dr. White's paper on interscapulo-thoracic amputation.

Besides the original articles and hospital reports a considerable section is devoted to current medical literature, which is under the management of a representative board of Associate Editors. Reviews of books, the transactions of the University of Pennsylvania Medical Society and alumni notes comprise the remainder of the issue.

Handbook of Diseases of the Eye.—By H. R. SWANZY, F.R.C.S.I. Seventh Edition. 8vo. pp. 633. London: H. K. LEWIS, 1900. Price, 12s. 6d.

SWANZY's well-known Handbook on Diseases of the Eye, in its seventh edition, does not need much recommendation at the hands of a reviewer. It has now for some fifteen years been one of the most popular and satisfactory text-books on the subject, and we can say for the last edition what has been said about the former ones, that there is no book of its size in the English language which at all approaches that of the Dublin surgeon. The last edition contains a clear account of Mackenzie Davidson's method of employing the X-rays for the detection of foreign bodies within the eye; also a description of Mr. Mule's operation for ptosis, and three useful tables specially prepared for this book by Dr. Louis Werner, on the actions and relative values of mydriatics, myotics and local anæsthetics used in ophthalmology. In fine a succinct and practical account of the subject in its most modern aspect is given, and for the student or the practitioner in India we know of no book which can be more confidently recommended.

Walsham's Theory and Practice of Surgery.—London: J. & A. CHURCHILL, 1900. Price, 15s.

WHEN the circulation of a medical work has reached the high figure of 33,000 it can safely be said that it has passed beyond the pale of criticism, and needs very little introduction to the reader. Walsham's Surgery is now in its seventh edition, and has been thoroughly revised and is up to date. The chapters on the Surgery of the brain, stomach, liver and gall-bladder, have received special attention, the volume has

also increased in size, and the type improved, many new illustrations have been added, including 16 skiagram plates.

We are glad to see on p. 805 that the influence of Indian Surgery is making itself felt, and that Mr. Walsham writes that "the brilliant results obtained by Colonel Keegan" have convinced him that litholapaxy is the operation of election for children as well as adults.

The volume is one that can be strongly recommended, and has nothing to fear from the numerous rivals which have recently appeared in the field. For our Indian medical schools no better volume on surgery could well be placed in the hand of senior students.

Current Literature.

PATHOLOGY AND BACTERIOLOGY.

On the Hæmolytic action of Snake Toxins and Toxic Sera.—By J. W. W. STEPHENS. (*Journal of Pathology and Bacteriology*, February 1900.) After an elaborate study of the subject the author arrives at the following conclusions from his experiments:—1. That an antitoxic serum can act on toxins other than, but allied to, that used in the preparation of the serum. 2. That the hæmolytic constituents of snake poison toxins, and hence snake toxins as a class, are not identical. 3. That against a minimal lethal dose of daboia toxin (Russell's viper) 0.5 c.c. of Calmette's antivenom has very little action. (This has previously been shown by D. D. Cunningham in the *Scientific Memoirs*.) 4. That the antihæmolytic properties of antivenomous sera must be increased in order to afford any efficient protective power serum, e.g., against pseudochis toxin or daboia toxin.

Mr. Hankin's method of Isolating the Enteric Bacillus.—Hilbert in the *Centralblatt für Bacteriologie*, Vol. XXVII, p. 586, criticises Mr. Hankin's method of isolating the enteric organism from water, having failed to do so in the water of 16 localities in which enteric was present in Germany, but as he appears to have only tested one sample from each, and was without the extended experience of the method which its originator considers essential to success, this negative result is not of much weight against the positive ones of other workers, including Professor Adami in Montreal. Hilbert also states that it is impossible to isolate the enteric organism by this method if the bacterium coli is also present, basing his statements on experiments in which he attempted to isolate the enteric organism added to unsterilised water in the presence of coli bacilli. However, he seems to have used organisms which had not been acclimatised to living in water, and which would therefore tend to rapidly die out, while in Hankin's experiments the enteric organisms were first slowly habituated to living in water by adding increased quantities to broth cultures, a precaution the omission of which detracts from the value of Hilbert's results. (Recently I have had an opportunity of examining the water of a ship on which a severe outbreak of enteric fever had occurred, and by means of Hankin's method I have isolated organisms from two of the sources of supply which have given all the reactions of enteric organisms as far as I have yet been able to test them, so that the positive evidence in favour of the value of Hankin's method is increasing steadily.)

LEONARD ROGERS, M.D., M.R.C.S.

MEDICINE.

Croton Oil in Practice.—By A. K. Bond, M.D. (*The Therapeutic Gazette*, March 15th, 1900.) The seeds of *Croton Tiglium* have long been in common use amongst the natives of India as a purge. The unpopularity of this drug in Europe is ascribed to the violence and uncertainty of its action. To avoid the latter, Dr. Bond uses a phial containing a sample of known potency. The former is due to the utterly wrong use of the drug. One or two drop doses are excessive. "Men do not estimate the effect of a breeze by studying a tornado." The writer considers one or two drops of croton oil as equivalent 'dosimetrically' to forty grains of calomel or one grain of morphine; but such doses do not represent the ordinary efficient amounts of these drugs.

Dr. Bond lays down the ordinary dose of croton oil as one-eighth to one-sixth of a drop, freshly made up in bread pills. This quantity gives a gently purgative action, without violent or even disagreeable results. Manna makes the best vehicle for croton oil.

The use of croton oil is contra-indicated in inflammatory conditions of the alimentary tract. It is specially useful in obstinate constipation and stercoræmia, in the constipation of opium or pregnancy in ordinary sick headaches and epilepsy accompanied by an aura, in bilious vomiting and asthma.

Citric Acid for Ozæna in Atrophic Rhinitis.—By Lewis S. Somers, M.D. (*The Therapeutic Gazette*, March 15th, 1900) First cleanse the parts with an alkaline solution to remove crusts, and then insufflate a powder composed of citric acid 25 parts and sugar of milk 75 parts. Citric acid is stated to be markedly irritating to mucous membranes, so it should be well diluted. It is described as essentially a deodorant, though it has no direct curative effect upon the morbid tissues. Its action is transient, so it must be used regularly, otherwise the ozæna returns in the course of a day or two.

Proprietary Chemicals.—(*University Medical Magazine*, May 1900) Dr. A. W. Miller read an instructive paper on this subject before the Medical Society of the University of Pennsylvania. He inveighs against patents and proprietary rights, and protests against the extensive use of many of these chemical preparations, which owe so much of their popularity to lavish advertising.

Antipyrin was originally excluded from the U. S. Pharmacopœia, because it was manufactured under a patent. Yet it met with an enormous sale until the expiration of the patent after which its consumption was markedly curtailed, notwithstanding the great reduction in price. Antifebrin was similarly boomed, though it was being sold at a tenth of the price as acetanilid which was not nearly so much in vogue as long as antifebrin was being advertised. Antikamnia is probably a mechanical mixture of acetanilid, caffeine and sodium bicarbonate. The pulvis acetanilidi co. of the National Formulary fairly represents it, and it can be compounded at about a tenth of the price of antikamnia. Dermatol is the copyrighted title of bismuth sub-gallate, and its price is much cheaper under the latter name. Creolin is composed of crude cresol, oleic acid and water of ammonia, and a combination of 500, 250 and 160 grammes of these substances with sufficient water to make in all 1,900 grammes costs but a fraction of the price demanded for cresol.

Aristol has been copyrighted as a name, yet any one can make and sell thymol iodide. "Although these facts are plainly stated in the text-books, there are still some practitioners who compel their patients to pay double, or even treble, prices by carelessly prescribing aristol, instead of using the scientific name of this article."

"Proprietary rights are also claimed on hyoscine, even when this is made from *scopolia carniolica*. Hence hyoscine hydrobromate is quoted at sixty cents per grain, while the identical substance under its proper name of scopolamine hydrobromate sells at fifteen cents per grain."

Immunity to Diphtheritic Infection, and Re-infection after the use of Antitoxin.—(*The Medical Chronicle*, May 1900.) Dr. R. W. Marsden describes four cases in which laryngeal symptoms, or the formation of membrane, recurred from three to five weeks after injection of antitoxin, and all of which were permanently relieved after re-injection. In three of the cases tracheotomy was performed simultaneously with the injection, and in two of them second tracheotomies were required along with the second injections.

He concludes that immunity after an attack of diphtheria may cease to exist after the expiration of three weeks, when that attack has been terminated by the injection of antitoxin. His experience leads him to advocate re-injection of antitoxin during convalescence whenever "croupiness" or signs of early laryngeal stridor supervene.

A Pre-Exanthematous Sign of Measles.—By P. Watson Williams, M.D. (*The Bristol Medico-Chirurgical Journal*, June 1900.) As measles is highly contagious in its pre-eruptive stage, such a prodromal symptom as that described by Koplik in 1896 merits attention. "Koplik's spots" appear from twelve hours to three days, or even five, before the ordinary exanthem. They may be only two or three or innumerable, and are most common on the buccal and labial mucosa in contact with the teeth. They are "small, irregular spots, of a bright red colour. In the centre of each spot there is noted, in strong daylight, a minute bluish white speck. These red spots, with accompanying specks of a bluish-white colour, are absolutely pathognomonic of beginning measles, and when seen can be relied upon as the forerunner of the skin eruption." Koplik considers these spots of the utmost importance in differential diagnosis. Cases of a morbilliform eruption without these spots are cases of röteln, not measles. Dr. Williams' experience does not permit him to speak so positively as Koplik, but he admits that he has found this sign of great value in arriving at an early diagnosis of measles.

Swedish Medical Gymnastics in Chronic Diseases of the Heart.—By E. Christofferson. (*The Bristol Medico-Chirurgical Journal*, June, 1900.) The object of these passive movements is to improve the weakened circulation, and thus facilitate the work of the heart, and further to strengthen the heart by active exercises in selected cases. Three groups of passive exercises are made use of, kneadings, rollings and respiratory movements.

Muscle-kneading is more properly a variety of massage. It increases the lumen of the peripheral vessels, and thus relieves the heart of some of its load; it acts both as a pressure and a suction-pump. *Abdominal-kneading* is useful in valvular lesions, with venous congestion of the abdominal viscera.

The splanchnic nerves are mechanically stimulated, and through this contraction of the mesenteric arteries follows.

Rollings are applied to the ankle, hip, shoulder and wrist joints. "They consist of the combined movements of extension, abduction, flexion and adduction in the respective joints so as to produce a rolling, performed by the operator, while the patient is quite passive in the sitting or recumbent position." The result is a lengthening and shortening of the veins around the joints, and a suction of blood from the surrounding parts. *Trunk-rolling* is also much used.

Respiratory movements, to make the respiration deeper and fuller, and thereby induce stronger suction of blood to the right heart and augmented pulmonary circulation, are also much esteemed in this form of treatment.

In addition to these three forms of exercises, *local heart-treatment* is advocated. "This consists of light strokings over the heart and in a light "tremble-shaking," performed with one of the operator's hands placed over the heart of the patient." Dr. Levin, of Stockholm, found, as the result of 6,000 observations in the course of ten years, that this local heart-treatment diminished the pulse rate by 8-12 beats per minute.

The *active exercises* are practically the same as those used in the Nauheim treatment, except as regards those in which the arms are carried above the level of the shoulders. They should, however, be avoided in severe cases with failure of compensation.

Passive exercises are given in all forms of heart disease treated by gymnastics, *i.e.*, valvular affections, cardiosclerosis and chronic myocarditis, fatty infiltration, idiopathic hypertrophy and dilatation, also in Basedow's disease and other cardiac neuroses. The active exercises are adopted in cases of fatty infiltration, some cardiac neuroses, and in valvular lesions with good compensation.

D. M. MOIR.

FOREIGN EXTRACTS.

For the treatment of Compound Fractures of the Bones of the Leg.—Chandoy (*Thèse de Lyon*, No. 12 of 1899) gives the following directions:—

Where the lesion of the skin is but small and there is no extension of bone, all that one need do is to disinfect the part thoroughly and then treat the case as one of simple fracture, keeping a watch on the temperature where, on the other hand, the fragments stick out through the skin, the fracture having been caused by great violence, and the wound is of considerable extent, the ends of the fragments should be removed, and adequate drainage provided. Even if such a case is seen late, when infection of the wound is present, resection of the ends of the fragments should be tried.

Amputation should be performed only where the nerves and vessels of the limb have been extensively injured, or where infection of the wound persists in spite of resection of the ends of the fragments with good drainage and antiseptics.

Permanganate of Potash as an Antidote in poisoning by Strychnine and some other Alkaloids.—Paratore in an article in the *Clinica Medica Italiana*, 1899, p. 131, reviews the pharmacology of KMnO_4 , and from his experiments concludes that the following alkaloids are destroyed by the salt; atropia, aconitia, caffeine, cocaine, hyoscyamine, pilocarpine, veratrine, nicotine, aconine and strychnine.

He recommends that in poisoning by the last-named alkaloid the stomach be freely washed out with a solution of the salt.

Our readers will doubtless remember the action of the salt on morphia, and its application in the treatment of poisoning by that alkaloid.

Protargol in Gonorrhoea.—Brandi, of Vienna uses a 1—200 solution for the acute attack, after the first acute symptoms have disappeared under low diet and baths. For chronic inflammation of the anterior urethra he begins with the 1—200 solution and gradually increases the strength to 2%. When the deep urethra is affected he instils into the deep urethra 1 cc. of a 5% solution twice daily, and after the third day uses a 10% solution. He finds that this method of treatment gives him better results than any other.—[*Klin. Therap. Wochens.*, 1899, p. 700.]

The Treatment of the Puerperium.—Speaking at the Eighth Congress of the German Gynaecological Society, Küstner, of Breslau, said that he found

that the system of keeping the patient long in bed was not good. In his practice he allows the parous woman to get up on the fifth day, and this he believes has as its result: More speedy involution of the uterus; easier removal of the lochia and less tendency to constipation and meteorism where the labour has been normal. Olshausen, of Berlin, disputed these conclusions, as he believed that the system followed by Küstner predisposed the patient to malpositions of the uterus and secondary infection.—[*Gaz. Hebdom.* No. 54]

Personally we are of opinion that Küstner has right on his side.

Ventral Decubitus in Vesico-vaginal Fistula.—Vitrac strongly recommends that the patient after operation should be kept lying prone, and a catheter tied in the bladder. Basing his opinion on the experience of Jowers of Brighton, he believes that the ventral decubitus *plus* catheter tied in, will cure a case without operation.—[*Gaz. Hebdom.*, No. 100.]

Glaucoma treated by Galvanisation of the Cervical Sympathetic.—Allard, of Paris, applies the positive pole to the neck along the course of the sympathetic—using a constant current of relatively high intensity (15—20 m.a.). Of ten cases of simple chronic glaucoma thus treated and observed by competent ophthalmologists he found in two cases—the periorbital pain which had resisted all other treatment, was removed; in these vision had been completely lost in three cases—great improvement of vision after two months' treatment; in one case arrest of the glaucomatous atrophy which had made rapid progress before the treatment was begun; in two cases seen at the beginning of the disease, a cure was brought about, the visual acuity becoming as before, and the field of vision normal after 15 to 20 applications of the current.

The positive pole exercises a sedative action on the excitability of the sympathetic, and thus has a similar (though naturally less intense) action to section of the nerve.—[*Gaz. Hebdom.*, No. 80.]

W. D. SUTHERLAND.

THE ANNUAL SANITARY REPORTS.

THE BENGAL SANITARY COMMISSIONER'S REPORT.

THE connection between rainfall and the health of a community in India is so little understood that it is impossible to draw any sound conclusions from the very general remarks on the subject with which Major H. J. Dyson, I.M.S., has introduced his annual sanitary report for the year 1899. Nor can the question be profitably discussed for such a large area as that of the Lower Provinces, in which the rainfall and other climatic conditions vary to such a degree. Nevertheless, we think, that an exhaustive study of the recorded rainfall and the prevalence of say "fever" might with advantage be attempted, for a few districts at least. The question would have to be also studied for many separate diseases, for it may happen that a scanty rainfall may be followed by a small crop of malarial fever and by a terrible outbreak of cholera. In one part of this report we are told that inundations had a good effect on the health of a locality; in another part it is said that the marshes, tanks and pools are the "unhealthiest features of the district" (*sic*). We only point out this to show that we require more than vague generalities when discussing a question of this importance and would recommend that attention be directed for a series of years to the definite question of rainfall and cholera or rainfall and malaria; in the latter instance it would be well for reporting officers to base their statements on some exact observations as to the connection, if any, between fevers and the presence of the anopheles or with any particular water-supply. Passages from Annual Reports which talk vaguely about "miasmata" might with advantage be left in the obscurity of the waste paper basket, instead of being quoted in a report of a scientific nature. We have also looked in vain for any description as to the nature of the periodical outbursts of fever, which the reports describe as "of a peculiarly deadly type" in the Faridpur and Jalpaiguri districts. If we remember aright, the lay papers have spoken of a form of fever in this part of the province which has even been likened to the deadly black-water fever of Africa. This we consider is a matter of the utmost importance, both in the interests of the inhabitants and of the important industries carried on in these districts.

The amount of inoculation against cholera depends perhaps naturally enough on the prevalence of the disease. If labourers and employers of labour are frightened about the disease they will be

the more willing to resort to it, and we are glad to see that Major Dyson reports a great impetus in cholera inoculations in the year 1900, which we are afraid will turn out to be a bad cholera year. The table given on page 50 as to the effect on public health of large and important sanitary works proves little or nothing, as indeed is the case with the similar tables in the reports for other provinces. We prefer to consider an apparent increase of the death-rate since the opening of a water-works as evidence rather of increased accuracy in the registration of disease. The report scarcely refers to the question of plague in Bengal, which has perhaps been the most important public health question of the year. We presume that it will be dealt with in some other report.

THE N.-W. P. & O. SANITARY REPORT.

THE year 1899 in the North-West Provinces and Oudh was on the whole a healthy one, though not equal to the year preceding. The birth-rate was no less than 48.09 per mille and the death-rate 33.19. The birth-rate was in fact the highest on record and would appear to justify the seeming paradox of Doubleday, that one of the consequences of famine is to increase fertility. The ratio of male to female births was 1,074 to 1,000. An interesting diagram, on page 8, graphically illustrates the fact that the months of February, January and March have the lowest death-rates, and October, September and August the highest. The diagrams which illustrate the yearly fluctuations of the chief diseases are also a valuable feature of this report. In the last 22 years there have been only three very bad cholera years, viz., 1887, 1892, and 1894, in which the actual deaths by thousands rose to 180 and 200. Contrast this with the two past years, when the rates were considerably under 10 per mille. In a similar way the fluctuation of small-pox is shown; in the past thirty years there have been only three very bad years with ratios of deaths per myriad of the population from 31 to 45. It is also noticeable that in the past 15 years the small-pox ratios have been much lower than in the fifteen years from 1870; in only one (in 1896) has the rate risen over 18, and only three times over ten per myriad. It is, we think, to be regretted that it is not possible to trace the vaccination figures in the Sanitary Reports of each province, the result being that each subject is treated separately, and it is not possible to draw any conclusion on the efficacy of the efforts of the Vaccination Department. To include the vaccination figures we know would necessitate an alteration in the vaccination year, but such a year might statistically begin in January.

The report of the Deputy Sanitary Commissioners, Captains Chaytor-White and Fullarton, are also appended, and contain much of interest.

We are glad to see in Captain Fullarton's report a short account of that excellent practice of permanganating the polluted wells, a practice which we consider to be one of the most important advances made within the decade for the control of cholera outbreaks. In Saharanpur, Captain Fullarton supervised the disinfection of no less than 995 wells in seven days. He recommends that in case of an outbreak every well, public and private, should be permanganated (if with Captain Fullarton we may coin a word which appears to be wanted), and that the whole of the wells of the affected area should be done if possible in the same day, and of course under efficient supervision. Captain Chaytor-White tells us that the outbreak of plague in Allahabad District was traced to three weavers who had returned from Bombay, owing to the closing of the mills, so it is possible that the present crisis in the cotton trade may also have the effect of scattering infected weavers over various parts of India from Bombay.

On the whole the report is an interesting one, and the greater credit is due to Major Giles in that he did not take over the duties of Sanitary Commissioner till after the close of the year on which he had to report.

THE MADRAS SANITARY REPORT.

A CHARACTERISTIC feature of the reports of the present Sanitary Commissioner of Madras is the excellence of the graphic charts, and this year they are of special excellence, notably those which illustrate the connection between rainfall, prices of food and the birth and death-rate. The Madras birth-rate in 1899 was 31 per mille, which is the highest on record for the Presidency, though markedly inferior to that of North-Western and Oudh and other Provinces. This Colonel King points out is in part a reaction after famine. He also shows that a famine combated on modern lines is no longer to be considered as a "natural check" on population, as was, for example, that of 1877, when the adult population suffered to such an extent that the natural increase of the population was checked for several years. In Madras, as in North-Western Provinces, the male births (recorded) are in excess of the female. Colonel King gives his reasons for not accepting as correct the very low death-rate of 17 per mille of the estimated population. It is, we note, incidentally stated that "typhoid fever is an acknowledged factor in the mortality of natives of South Canara and Malabar Districts." This we consider surprising, and we would like to see a fuller

report on this question. We should be obliged if medical officers serving in those districts would give us the details on which this statement is based. It is one of the greatest interest in connection with the prevalence of the disease in India. We know of no other districts in India of which the like has been or could be said. Cholera was not greatly prevalent in Madras last year; as usual it was greatest during the monsoon periods. There was more opposition to vaccination than usual, the people "hopelessly confusing plague inoculation with vaccination." The year was a healthy one as regarded malarial fevers, but this is not to be ascribed to measures of prevention, though as Colonel King says, "there have not been wanting those who have hunted the anopholes." Colonel King writes as follows: "There is no lack of instances in this Presidency where a locality in which mild fever has existed has been converted into a deadly malarious place, by the introduction of superfluous water for irrigation purposes, and there are instances where the limitation of irrigation has been followed with beneficial results, but none where extensive works of drainage have secured the admirable curative influence obtained in other countries." The question is in fact "under intermittent consideration." During the year Major A. E. Grant, I.M.S., the Professor of Hygiene, called attention to the severe nature of the fevers in Madras town, as illustrated in the wards of the General Hospital. This opinion was combated by certain medical officers who would not, it appears, admit their malarial origin. Colonel King apparently agrees with Major Grant, as a result of a careful inquiry in 1894, in which it was shown that severe fevers have been produced by the disturbance of the subsoil and surface water by canals and railways. It must not, however, be assumed that malaria is the sole cause of fevers in Madras city, for "typhoid is by no means uncommon."

We have commented upon the Sanitary Commissioner's views as to the nature of the sickness at Rajahmundry in another place.

The report is well worth reading, and marked with more personal characteristics than any other Sanitary Report we have read. It is undoubtedly clear that Colonel King is not only an enthusiastic sanitarian, but an unusually level and clear-headed one.

THE PUNJAB SANITARY COMMISSIONER'S REPORT.

THE birth-rate of the Punjab, like many other provinces of India, was very high in the year 1899, being no less than 48.4 per mille, the highest in India. It would be interesting if we could ascertain the causes of the very great differences in the birth-rates of the various provinces, which are as follows:—(in 1899.) Punjab, 48.4; Bengal, 42.9; N.-W. P. and O., 48.00; Assam, 35.4; Central Provinces, 47.2; Madras, 31.3; Bombay, 36.4.

Lieutenant-Colonel Bamber attributes this figure to under-estimation of the increase of the population since the last census, an improvement in registration (that upsetting factor in all Indian vital statistics), and to the previous year's good health. It is better not to speculate on these points till the next census has shown us how far the present estimated populations are correct or not.

The estimated death-rate is only 29.5, a low rate due to the absence of the usual autumnal fever season, from the failure of the monsoon. On page 10 of the report there is a useful chart showing the death-rates from the chief diseases for the past year, and for the decennial average, cholera was not very prevalent during the year and there were no great epidemics. In Hissar District the Civil Surgeon records the *de novo* origin of the disease by drinking the dirty water of a tank; it never seems to have occurred to him that infection might have been carried to this tank. In the Amritsar District an outbreak is attributed to a mad man who was suffering from purging, and vomiting jumping into a well. It is satisfactory to see the universal use of the permanganate method of disinfecting wells.

Another chart shows in a graphic way the rise and fall in fever mortality in the Punjab since the commencement of registration in 1867. It is, on the whole, a record of increasing prevalence, the death-rate being over 18 per mille for the past dozen years. Much of this must be put down to improved registration, but it would be interesting to see how far the increase of rice cultivation, due to an increased water-supply, has affected the fever mortality rates in those districts in which canals have brought about Bengal-like conditions.

The Sanitary Commissioner remarks, probably correctly, that many of the deaths attributed to fever are probably due to influenza. From the bite of mad dogs only 111 deaths were recorded.

THE ASSAM SANITARY REPORT.

FROM the first time the annual vital statistics of the Naga and the Garo Hills are included into those of Assam, the birth-rate is low as compared with other provinces, but that for 1899 is

* See, however, note on fevers of the Delhi and Hissar Districts above, p. 437.—Ed., I.M.G.

considerably over the five years' average, and is the highest on record for Assam. The death-rate shows an equally large fall from the average of 36.3 to 31.0. In fact the birth-rate this year exceeded the death-rate by 4, whereas in the previous year the rates were reversed.

One generally associates Assam with a cholera prevalence, so it is satisfactory to see that except for slight outbreaks in November and December this disease was "practically non-existent." An equally satisfactory report is made on the prevalence of small-pox. We have already commented upon the question of the decline of *kala-azar* in Assam; it is only when the figures for that disease and for "fever" are added together that it is possible to judge of this question. When this is done as in the Chief Commissioner's Resolution it is seen that in the district of Nowong, the deaths from these two diseases rose steadily from the year 1893 to 1897, and since then there has been an equally marked decrease. It is not easy to gather what is the official view of the nature of *kala-azar*. We understood that they accepted the views of Rogers and Ross that it was an intense form of malarial fever, but in the resolution we find the statement that "there can be no doubt that a large number of deaths attributed to *kala-azar* during the past two years were really due to fever." But after all Secretariat resolutions are not scientific documents.

MADRAS ANNUAL REPORT ON CIVIL HOSPITALS.

THE report this year submitted by Surgeon-General Sinclair takes the form of a few brief notes attached to a mass of statistics which show the working of the Civil Medical Institutions of the Presidency of Madras. As regards the attendance it is satisfactory to note an increase both in in-patients and in out-patients. In another place the figures for the attendances and for the operations have been given, so here we only give the names of the officers who have done the most operations during the past year, as follows:—Among the Commissioned Medical Officers Lieutenant-Colonel Sarkies, I.M.S., heads the list with 90 operations, then Lieutenant-Colonel Nailer with 76, Captain Williams 71, Captain R. H. Elliot with 48, Captain Gabbett with 40, Captain Illington with 41. Of the Civil Assistant Surgeons those at the head of the list are T. R. S. P. Pillai, J. Lychander, A. P. Fernandez, C. P. Gupat and B. F. Gonsalvez, with operations from 72 to 41 to their credit.

Service Notes.

As showing a trend of public opinion at home the following paragraph is quoted from the *Saturday Review* of 25th August:—

"The military hospital difficulty is likely to assume a new aspect if the Indian troops are detained long in China. Medical aid to Native soldiers is supplied by the Indian Medical Service. This is almost a necessity. Such aid would be less effective and less welcome if rendered by doctors unacquainted with the language and habits of their patients, especially in cases where caste scruples might arise. It is doubtful if the service is strong enough to stand the fresh strain of foreign service. It could not undertake the task without detriment to other interests which have an earlier and stronger claim upon it. The sphere of the activity of the Indian Medical Service is not confined to military duties. It has also to supply the civil surgeons and professors for all India, while the organisation of both medical and sanitary departments are in its hands. There is little hope that the difficulty can be met by the exhausted device of cancelling and refusing leave. Nor is the appeal to retired officers likely to produce many efficient men. When the British Army Medical Department is reorganised, the Imperial Government will have to support a special Indian section if the Indian Army is to be treated as an Imperial Army Reserve."

It is not easy to see why Major R. H. Firth, R.A.M.C., was appointed to succeed Colonel Lane Nutter as Professor of Hygiene at Netley. It was naturally supposed that the claims of Major A. M. Davies, R.A.M.C., the senior officer, would be recognised, more especially as Major Davies acted as Professor during the long illness of the late Professor De Chaumont. Since then has been employed on special bacteriological work in India, and has made a name for himself as a sanitarian.

SIR REDVERS BULLER is a man who can hit out straight, so Mr. Lees Knowles must have felt when he perused Sir Redvers' letter in the *Times*. The General writes thus of Mr. Knowles' charges:—"Was ever a more shameful accusation more shamelessly published? There were then but three colonels, Royal Army Medical Corps in Natal, outside Ladysmith. Colonel Galloway, principal

medical officer, has procured for the Natal Field Force the most complete hospital system ever provided for an army in the field. He is, I believe, the first P.M.O. who has ever provided nurses in the hospitals receiving wounded on the battle-field. His organising power and untiring energy, with assistance from home, added 4,700 improvised beds to our hospital accommodation, and provided nurses, doctors, and attendants, some of them (let Mr. Knowles note) from Johannesburg. Colonel Clery was in charge of No. 4 General Hospital of 520 beds which was expanded into Mooi River Hospital of 920 beds; it was justly referred to by the writer of the articles in the *Times of Natal* as a model of what a hospital should be. Colonel Allin was senior medical officer of the field army and superintended the collection and subsequent removal of the wounded and sick from the front. I believe this duty has been accomplished by him more rapidly and with less discomfort to the sufferers than in any previous campaign.

"I could say as much for the next senior officers R.A.M.C., but colonels are mentioned, and I challenge Mr. Lees Knowles and his correspondent of high position to say which colonels they refer to, and either prove their accusations or withdraw their slander.

I have the honour to be,

Sir,
Your obedient servant,
REDVERS BULLER,
FAARDEKOP, TRANSVAAL,
General."

4th August, 1900.

THE following is the list of successful candidates for Commissions in the Royal Army Medical Corps at the recent examination in London:—

Names in order of merit.	Marks.	Names in order of merit.	Marks.
1. H. J. McGregor ...	2,779	6. C. D. Myles ...	2,040
2. W. R. P. Goodwin ...	2,612	7. R. N. Hunt ...	1,986
3. J. H. Brunskill ...	2,303	8. H. E. Howley ...	1,916
4. A. C. Duffey ...	2,231	9. R. F. M. Fawcett ...	1,855
5. A. W. Gibson ...	2,205		

The following candidates for the Indian Medical Service were successful at the competitive examination held in London on August 17th, and following days:—

Place.	Marks.	Place.	Marks.
1. C. W. Melville ...	3,476	8. W. H. Leonard ...	2,786
2. N. S. Wells ...	3,033	9. J. E. G. Swan ...	2,737
3. R. McCarrison ...	3,005	10. R. McL. Dalziel ...	2,548
4. J. Masson ...	3,000	11. A. W. C. Young ...	2,500
5. W. M. Anderson ...	2,991	12. J. J. Robb ...	2,430
6. W. D. Pringle ...	2,985	13. S. A. Ruzzak ...	2,425
7. E. H. B. Stanley ...	2,870	14. R. B. B. Foster ...	2,385

ONLY nine men qualified for the R.A.M.C., whereas the vacancies advertised for were over 30, and the real numbers wanted probably one hundred. Matters are becoming or rather have become very serious. A radical alteration in the Army medical system is badly wanted.

A RECENT issue of the *British Medical Journal* had a couple of columns on the grievances of the I. M. S., and we have received several letters of similar import. It has always been the policy of this *Gazette* to avoid the discussion of such matters; this several of our correspondent think is a mistake. We cannot but admit, however, that the appointments of Civil Surgeons are by no means what they used to be, in point of emolument especially, and it is these appointments which are the attractive feature in the service, and that which still enables the service to command the best men from the schools. Anything which tends to make the position of the Civil Surgeon less attractive must undoubtedly in time have the very worst effect on recruiting. The undermining of the service, for several years past, is an admitted grievance, and one which could be easily remedied.

IN a discussion at the British Medical Association meeting Mr. Treves said: "The R.A.M.C. and the Civil Surgeons worked in perfect harmony throughout, a fact largely due to the unselfish attitude of the R.A.M.C. They did not 'stand on their dignity' at all, and their generosity and unselfishness has been a very striking figure of the South African campaign."

DR. F. W. FORBES ROSS "as a colonist advocated the treatment of enteric fever cases, when epidemic in a campaign on low mounds of recently dug soft earth covered with a waterproof sheet, as conducive to their comfort and to the non-spreading of disease by infected bedding."

Mr. Burdett Coutts would, however, call this "mud."

WE note that Sir G. S. Robertson, I.M.S., retired, was a Liberal candidate for Sterlingshire; he has, however, been defeated.

SIR GEORGE recently read a paper on "Geography" at the British Association of Science.

ONE gets accustomed to inept criticism on the part of stay-at-home critics, but at times they become so absurd as to deserve notice. One of the latest is the following editorial utterance in a recent number of the *Medical Press*. It is written—"Every death from cholera in British barracks is a disgrace to the Army Medical Service." The matter is so simple, of course, to one seated in an office chair at home. Why not say every death from enteric fever in London is a disgrace to the Medical Officers of Health and the Local Government Board? What about the persistence of typhoid in Belfast? If cholera control is so simple, surely that of enteric is also.

MAJOR RONALD ROSS (I.M.S., retired) read a paper on the mosquito and malaria at the recent meeting of the British Association.

WE may be permitted to mention that Major W. J. Buchanan's "Manual of Jail Hygiene" has now been adopted for the use of medical subordinates in the jails of Bombay, Central Provinces, Punjab, and Assam as well as in Bengal. In consequence of this demand the Government of Bengal has ordered a reprint of another hundred copies of the second revised edition.

LIEUTENANT-COLONEL NEILL CAMPBELL, I.M.S., on being recalled from furlough has been transferred from Assam to Bengal and is posted to Purnea.

LIEUTENANT-COLONEL R. H. WHITWELL, I.M.S., has been granted leave on medical certificate. His place as Civil Surgeon of Howrah is taken by Lieutenant-Colonel Bovill, I.M.S., recalled from furlough. Lieutenant-Colonel Bovill had gone home on leave pending retirement, but was recalled owing to the strain of the China War.

On being recalled from furlough Lieutenant-Colonel T. Grainger, I.M.S., is posted to Champaran District.

MAJOR B. B. GRAYFOOT, I.M.S., is posted to Satara as Civil Surgeon, and Captain J. B. Smith, I.M.S., to Poona, as Assistant Civil Surgeon.

CAPTAIN S. EVANS, M.B., acts as Health Officer, Bombay Port, during the absence of Major J. Crimmin, V.C., on privilege leave.

THE fitting up of the Hospital ship *Gwalior* appears to have been of the very best. Lieutenant-Colonel Crofts, I.M.S., so many years Medical Adviser to H. H. the Maharaja of Gwalior, is in medical charge, and with him Captain Malcolm Moore, I.M.S.

MAJOR J. CUNNINGHAM, I.M.S., informs us that cases of Malta fever have been discovered in Natives in Delhi.

THE interesting articles in the *Pioneer* for September 29th, throw an interesting light on the campaign of calumny against the hospitals in South Africa.

MAJOR T. MCCULLOCH, R.A.M.C., has gone to China to test the new searchlight acetylene lamp for searching for wounded men on the battle-field after nightfall. We gave an account of this lamp last year. Major McCulloch also takes with him the new jointed bamboo stretcher invented by Major A. G. Kay, R.A.M.C., Surgeon to the Commander-in-Chief.

WE would have liked to have heard of use being made of the admirable stretcher invented by Lieutenant-Colonel C. J. McCartie, I.M.S., described in a recent issue of the *Journal* of the U. S. I. of India. We note, however, that the patent folding dooly of Brigade-Surgeon Amesbury, I.M.S., is being tested in China.

SURGEON-GENERAL CHARLES SIBTHROPE, C.B., Madras Establishment, has also retired from the service from August 12th. He was appointed Assistant-Surgeon, April 1st, 1870, and Surgeon-Major-General, May 18th, 1894. He served in the Afghan War in 1879-80 with the Peshawar Valley Field Force, receiving a medal, and with the Burmese Expedition in 1885-6 in medical charge of the Head-quarters Staff, for which he was mentioned in despatches, promoted to be Brigade-Surgeon, and received the Frontier medal with clasp. He was nominated a Companion of the Order of the Bath in 1897.

THE retirement from the service is also announced of Lieutenant-Colonel J. W. Evans, of the Madras Establishment, from May 9th. His first commission dated from March 31st, 1880; that of Lieutenant-Colonel twenty years therefrom. He was in the Burmese campaign in 1885-6, and has the Frontier medal with clasp.

IN our list of the writings of the late Lieutenant-Colonel C. J. H. Warden, I.M.S., we omitted to mention one of the most important, viz., the *Pharmacographica Indica*, which he brought out in conjunction with Brigade-Surgeon W. Dymock, and Mr. D. Hooper.

THE death of Dr. John Anderson, M.D., LL.D., is announced. He was for many years Superintendent of the Indian Museum and a copious writer on scientific subjects.

CAPTAIN J. S. STEVENSON, I.M.S., who died of heatstroke at Lucknow, on 26th July last, was the son of Surgeon-General Stevenson of Netley, now P. M. O. in the Transvaal. We have several times noticed his good work in the fight against plague in Mauritius.

WE regret to learn that Colonel Bookey, I.M.S., has been invalided home from China. Colonel McB. Davis, C.B., I.M.S., succeeds him as P. M. O. of the China Field Force.

THE publication of the new revised edition of that invaluable volume, Lyon's "Medical Jurisprudence for India" is unavoidably delayed by the absence of Lieutenant-Colonel L. A. Waddell, I.M.S., its Editor, on field service in China.

THE Director-General, I.M.S., left Simla on 26th October for his annual cold weather tour. He goes to Karachi, Bombay and Madras, and is expected to arrive in Calcutta by December 20th.

MAJOR CLARKSON, I.M.S., recalled from furlough, acts for Major H. Pilgrim, I.M.S., for one month as Surgeon-Superintendent, Presidency General Hospital, Calcutta. Captain A. Gwyther, I.M.S., joins the same hospital as second Resident Surgeon.

LIEUTENANT-COLONEL R. SANDERS, I.M.S., has retired after many years service in India. For many year past he has held the appointments of Professor of Ophthalmology in the Medical College, Calcutta, and Superintendent of the Mayo Hospital. His reputation as an operator is well known. To see him do a cataract was a liberal education. His place will be taken by Lieutenant-Colonel Lewtas, I.M.S., recalled from furlough. Before going on furlough Lieutenant-Colonel Lewtas was Civil Surgeon of Darjeeling, and while at home he was employed at Netley and afterwards at the Herbert Hospital, Woolwich.

OWING to the recall from furlough of Major Drury, I.M.S., Captain L. Rogers, M.D., I.M.S., resigns the Professorship of Pathology at Calcutta, and reverts to the appointment of Deputy Sanitary Commissioner, Bengal. It is to be hoped he will be able to complete his examination into the question of Calcutta malaria.

WE have heard a lot about the shortcomings of the hospitals in South Africa but have heard less of their luxuries. In what military hospital in India or England will we find steam laundries, Russian baths, soda-water machines, steam sterilisers, cylinders of oxygen, 75,000 cigarettes,—yet all these are casually mentioned by Mr. A. D. Tripp in an account of the Imperial Yeomanry Hospitals in August.

One effect of the Commission will be probably to give a more liberal equipment to military hospitals. We have heard of one in India that had not the means of testing for blood in the urine!

LIEUTENANT-COLONEL E. MAIR, I.M.S., who has been officiating as Inspector-General of Jails, Bengal, for over two years, is confirmed in that appointment, vice Lieutenant-Colonel D. W. D. Comins, I.M.S., retired.

LIEUTENANT-COLONEL A. G. WILCOCKS, I.M.S., on recall from furlough is posted to Aligarh. Lieutenant-Colonel Wilcocks is a brother of the reliever of Kumasi.

ATTENTION is invited to clause 102, I. A. Circulars of 1900, notifying an amendment to the rules of the Insurance Branch of the Indian Military Family Pension Regulations.

CAPTAIN W. HENVEY, I.M.S., of Raipur, has been granted an extension of leave (m.c.) for six months.

LIEUTENANT-COLONEL G. HALL, I.M.S., on recall from furlough, returns to his appointment as Inspector-General of Jails, N.-W. P. Major Mactaggart, I.M.S., reverts to the Superintendship of the Central Jail, Lucknow, from 19th September.

MAJOR E. C. HARE, I.M.S., on recall from furlough, is posted to Gauhati, Assam.

LIEUTENANT-COLONEL J. W. V. MACNAMARA, I.M.S., on recall from furlough goes to Tezpur.

MAJOR G. DUNCAN, I.M.S., of the 2/5 Gurkhas, is now Civil Surgeon, Shillong, and also is acting for Colonel Carr-Calthrop, I.M.S., while the latter is on privilege leave.

LIEUTENANT-COLONEL J. LEWTAS, I.M.S., acts temporarily as Civil Surgeon of Patna, during the privilege leave (one month) of Lieutenant-Colonel French-Mullen. Meantime Colonel Saunders, I.M.S., though retired, acts for himself as Professor of Ophthalmology, Calcutta, pending, we presume, the appointment of Lieutenant-Colonel Lewtas.

MAJOR F. P. MAYNARD, I.M.S., is now acting as an Assistant at Moorfield's Eye Hospital, London. He has just taken the degree of Master in Surgery in Durham.

LIEUTENANT-COLONEL COBB, I.M.S., is permitted to return to India.

THERE will soon be a glut of senior Civil Surgeons in Bengal; it is not easy to find satisfactory appointments for all.

WE understand that Medical Officers recalled from furlough have the first claim on furlough when leave out of India is reopened.

ARTICLES which appeared in our columns within the past year by Captain Fearnside, I.M.S., Major J. Smyth, I.M.S., Captain McNaught, R.A.M.C., and Captain W. G. Liston, I.M.S., appear in German in the *Archiv für Tropen Hygiene* (for September).

THERAPEUTIC NOTES AND PREPARATIONS.

WE have received specimens of Messrs. Burroughs, Wellcome & Co.'s **Tabloid Blaud's Pills**. They are made of 8 grains each, to meet a special demand for tabloids of larger dose. They are so manufactured that the ferrous sulphate and the sodium carbonate do not interact till they are dissolved in the gastric juice. They do not undergo conversion to oxides. In this elegant form these tabloids form a very acceptable way of administering this well-known combination of drugs.

WE note that the **Pasteur Filter** was one of the very few filters which received a gold medal at the Exhibition at Paris.

Messrs. Burroughs, Wellcome & Co. send us an interesting pamphlet giving an account of their well-established new laboratory, which is under the direction of Mr. F. B. Power, Ph.D.

Treatment of Mosquito Bites.—For the treatment of mosquito bites the application of aqua ammoniæ may counteract the infectious principle, but this is doubtful, for it does not penetrate the tissues, as did the insect's bill. At any rate it reduces the suffering if applied with a little rag and left *in situ* a few moments.

Menthol sometimes affords considerable relief, the crystal-line, solid or camphoraceous substance being rubbed over the surface.

Neal highly recommends the following mixture for local applications:—

R Pulv. ipecacuanhæ ..	...	...	3ss
Spir. vini rectif.	...	...
Etheris, aa	...	...	3ss

M.

Ottinger affirms that ammonia is of little benefit, and that the best results are obtained from the application of ichthyol. In numerous bites and stings of flies, gnats, bees, wasps, &c., he found that it quickly and surely caused the phenomena of inflammation—which he attributes to its vasoconstrictor action—to subside. It is best applied pure in a quite thick layer, though it may be used in the form of an ointment.

Urticaria—Bulkley gives the following prescription as an application for urticaria:—

R Chloralis	...	...	aa 1 drachm
Camphoræ	...	...
Pulv. Amyli	...	...	1 to 2 oz.

M. Sig. Keep tightly corked in a wide-mouthed bottle. Rub in with the hand.

Gaucher prescribes the following application in urticaria:—

R Alcohol	...	...
Chloroform,	...	...
Sulphuric Ether	...	...	aa 3 parts
Menthol	...	...	1 part

M. Sig. To be applied in the form of a spray.

B. Wolff relieves the most acute symptoms of urticaria within a few hours, and effects a cure within twenty-four hours, by giving sodium phosphate in doses of 4 or 5 grammes every three hours, in concentrated solution.

The following solution may be used topically:—

R Prepared Calamine	...	...	45 grs.
Zinc Oxide	...	...	45 grs.
Carbolic Acid	...	...	15 grs.
Lime-water	...	...	1 oz.
Rose-water	...	...	2 oz.

Sajous: "Cyclopedia of Practical Medicine."—*Practitioner*.

Palatable Effervescing Quinine:—

R Quinine Sulphatis	...	...	3j.
Acidi Citrici	...	...	3ijss.
Syrup. Simplicis	...	...
Syrupi Aurantii Cor.	...	...	aa 3xv.
Aquæ Distillate	...	...	qs. ad. 3xvj.

M. Sig. Add ten or more drops to about 50 grains of water, in which 0·3 of bicarbonate sodium has previously been dissolved, and drink while effervescing.—*Practitioner*.

Brewer's Yeast for Boils.—Brocq (*La Presse Méd.*, January 28th, 1899) has revived this old remedy. He used it in eleven cases with good results, himself among them. The furuncles to which he was subject disappeared on taking for some time a teaspoonful of yeast in a glass of wine or water before meals. It must be fresh. Baker's yeast may be substituted for it.

Painful Menstruation.—The following combination is said to be useful:—

R Codeine	...	...	3 grain.
Chloral	...	...	15 grains.
Ammonium Bromide	...	...	15 grains.
Camphor Water	...	...	1 ounce.

To be taken while lying down.—*Practitioner*.

Notice.

SCIENTIFIC Articles and Notes of Interest to the Profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if requested.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., Calcutta.

Annual Subscriptions to the *Indian Medical Gazette* Rs. 12, including postage.

BOOKS, REPORTS, &c., RECEIVED.

The Salt Department Report.
The Bengal Vaccination Report.
Mr. Hankin's Cholera in Cantonments.
Medico-topographical History of Ajmere.
General Medical History of Rajputana.
L. Roberts on Nursing (H. K. L. Lewis), 1900.
Reports of Cures at Salzschlirf.
Agricultural Ledgers Nos. 7—13 (1900).
The Customs Report.
Transactions of the Grant Medical College.

COMMUNICATIONS RECEIVED FROM:—

Mr. W. Haffkine, Bombay; Major F. P. Maynard, I.M.S., London; Major A. B. Roberts, I.M.S., Simla; Col. Bamber, I.M.S., Simla; Mr. Cadge, Norfolk; Dr. D. F. Keegan, London; Major J. A. Cunningham, I.M.S., Delhi; Major D. M. Moir, I.M.S., Chittagong; Capt. Maddox, I.M.S., Chapra; Major Andrew Buchanan, I.M.S., Nagpur; Capt. J. T. Calvert, I.M.S., Dumbunga; Lt.-Col. R. N. Campbell, I.M.S., Purnea; Mr. E. H. Hankin, Agra; Major D. Simpson, I.M.S., Coimbatore; Capt. J. G. McNaught, R.A.M.C., Deolali; Lt.-Col. M. D. O'Connell, R.A.M.C., Peshawar; Lt.-Col. J. Duke, I.M.S., Abbottabad; Capt. Henry Smith, I.M.S., Jullundar; Capt. C. J. Fearnside, I.M.S., Rajahmundry; Dr. Sekar, Madras; Dr. A. H. Newsholme, Brighton; Capt. L. Rogers, I.M.S., Calcutta; Major D. G. Crawford, I.M.S., Hooghly; Capt. G. Lamb, I.M.S., Bombay; Mr. H. Milton, Cairo; Major R. Ross, Liverpool.

Original Articles.

THE TREATMENT OF STONE IN THE BLADDER.

By HERBERT MILTON,

Kasr El Ain Hospital, Cairo, Egypt.

THE services rendered to vesical surgery by the splendid work of so many Indian surgeons have long been recognised by their fellow workers at home and abroad, and the *Indian Medical Gazette* has conferred on us a great benefit by collating the experiences of those now carrying on the work. My own efforts have been largely inspired by their teaching, and I shall always be deeply grateful for the guidance afforded. It is with regret, however, that I notice in several articles a tendency to fall away from the original Bigelow's operation, which they had brought to such a high pitch of efficiency. Thus I find on page 335 that in 345, or nearly 10 per cent. of the 3,256 lithotrities performed at Hyderabad, it was found expedient to substitute an operation necessitating a perineal wound. Keith's operation probably affords a certain facility to the operator, but this advantage is dearly paid for by the doubled rate of mortality and by the prolonged stay in hospital, unless it be that the cases for which it has been performed were of exceptional gravity.

One indication for the operation seems to have been the youth of the patient, the table published on page 327 giving 106 perineal lithotrities in children as against 51 in men, the urethral lithotrities being respectively 503 to 449.

Indian surgeons have in former years been very strong in their advocacy of the extension to children of the advantages that Bigelow's operation has over lithotomy. Their later experience seems, however, to have induced them to substitute, at Hyderabad at all events, in a large proportion of the cases, an operation combining the two methods.

A further indication for Keith's operation is given by Major Stevenson who says on page 335: "The death-rate for large stones operated on by Keith's operation is only 3.6 for the last nine years, records of which any operator or hospital may well be proud."* Struck by the excellence of these results I searched for details of the 345 cases given in his list and failed to find them, but remembering that Baker in his papers to the *Lancet* of 10th October 1896 and 11th September 1897 had referred to Keith's operation, I looked them up and found that 19 operations out of the 345 had been given

by him in detail. To my surprise I found that 11 of the operations were for stones weighing half a dram and less, and that three only were for stones over half an ounce in weight, the largest being 6 drams and 5 grains. This last stone occurred in a boy of seven years, and is, with the exception of a stone of 1½ drams in a child of two years, the only one of the series which can be considered as in any way large. I note that two only of the stones were taken from adults; the one weighed 5 drams and 23 grains, the other 20 grains. No reason is given for the selection of Keith's operation for this latter case, but a statement is made in the second paper that the proportion of Keith's operation had diminished (children are here particularly referred to) since a smaller lithotrite had been available. I do not, of course, pretend that these 19 cases are a fair sample of the 345; they are, however, the only ones of which I have, in the limited literature at my disposal, been able to find details, and they are sufficient to show that the term large cannot be applied to all the 345 stones. The limit of size for a big stone has been taken by Keegan, and previously by myself, to be about 2 ounces.

For children and adolescents a sliding scale becomes necessary, and I think that half a dram for each year up to 10, and one dram for each further year up to 20, is a fair allowance.

Keith's operation has been largely substituted in India for Bigelow's, and to judge from the few details available more often perhaps than the nature of the case necessitated; but its claims cannot, I think, be generally recognised until we have more details of the cases in which it has been employed. I think there is every justification for asking for the publication of full details of the 345 operations performed at Hyderabad, at the hospital which saw the inception of the method. Until we are in possession of facts definitely showing its advantages over other methods, in the treatment of large stones, it seems justifiable to say that, judging from the records so far published from Hyderabad, Keith's operation is principally useful (1) in facilitating the crushing of stone in small children and in other patients with a diminished urethral calibre; (2) as a refuge for the imperfectly equipped; (3) as a stepping-stone to better methods. I note in two of the articles misapprehensions as to the hardness of Egyptian stones. Baker is of opinion "that in Egypt a large number of cases of calculus is found in patients with chyluria, and it is possible that a calculus deposited in a medium of this consistence is more readily crushed." The supposition is reasonable, but the premises incorrect; chyluria is rare in Egypt, and I have never met with a case suffering from stone. Captain Smith says: "In India we could consider what are termed hard stones in Egypt unusually soft." So decided an opinion should be based on

* The words quoted were only editorial comment upon the table furnished by Major Stevenson.—ED., I. M. G.

knowledge, and I have ventured to send you a specimen of every stone over 4 ounces in weight that I have ever crushed. Each specimen fairly represents the stone crushed, and a careful inspection will show that in nearly every case the specimen is a bit of the outside of the stone. The specimens are eighteen in number and divided into three categories: soft, 5; medium, 6; hard, 7; and I think you will agree that none of the third, and a few, if any, of the second, category could anywhere be termed "unusually soft." I note also that Captain Smith expresses an equally decided opinion as to the value of perineal lithotripsy as performed by myself and others. He says on page 318: "The operations of M. Dolbean, Harrison and Milton, as operations of election when compared with litholapaxy are, in my opinion, operations which only require to be mentioned to be condemned." Further on, in the same article, Captain Smith gives an analysis of 7,954 operations performed in various parts of India. Hoping to find therein some indications of methods better than my own, I examined the table carefully and found records of some 181 stones of 2 ounces and over. Of these 89 were treated by litholapaxy with 46 deaths. My own experience of litholapaxy for large stones has been 43 cases performed by the urethral route, and including four stones between 6 and 12 ounces, three stones between 12 and 16 ounces, and one stone of 16½ ounces, with four deaths.

By the perineal method, which Captain Smith so strongly condemns, I have performed 32 operations for large stones, including six between 6 and 12 ounces, and one stone of 14 ounces, with only two deaths.

The comparative mortalities are—Captain Smith's tables nearly 52 per cent.; my urethral litholapaxies nearly 9 per cent.; my perineal lithotrities nearly 6 per cent. Harrison has published even better results—15 cases with no deaths—and I utterly fail to see how Captain Smith can justify the condemnation he has expressed.

Keegan has suggested that the Indian patient has less power of resistance to advanced urinary disease than the Egyptian, and this may account for some of the difference in the results obtained; a portion of it may, however, I think, be justly accredited to the methods pursued. The excellent results obtained by Indian surgeons are undoubtedly due very largely to their great skill and experience, but also partially to the comparative smallness of the stones after allowing for the proportion of children treated. Thus in Baker's 404 cases only 197 of the patients were under 15 years of age, and the average weight of the stone was under 3 drams. The treatment of large stones has, to judge by Captain Smith's statistics, not yet reached the same high level, and I venture to hope that Egyptian surgeons may be able to repay some small portion of their indebtedness to their Indian colleagues by suggestions based on the unique experience afforded

by Egypt in the treatment of large stones. My personal experience of 100 large stones weighing in the aggregate nearly 400 ounces has led me into the following conclusions:—

1. That with a good lithotrite of dimensions within the limit of an average adult urethra almost any stone can be crushed, the exceptions certainly not being 2 per cent.

2. That the principal element of success in crushing a large hard stone lies in the prolonged and judicious application of the crushing force.

3. That a perineal lithotomy preferably lateral, followed by the crushing of the stone and its evacuation with suitable instruments will yield results little, if any, inferior to those of any other operation.

4. That the successful results of the above operation are largely due to the drainage afforded to the diseased bladder.

As a general expression of opinion, I should be inclined to say that Bigelow's operation is the best for the very large majority of stone cases, and that the surgeon will best treat the few cases too difficult for him by performing Keith's operation for children and perineal lithotomy for adults.

THE CAUSE OF BERI-BERI.

By E. R. ROST,

CAPTAIN, I.M.S.,

Civil Surgeon, Meiktila, Burma

MY attention was first called to this disease in an outbreak of beri-beri at Meiktila Jail in 1898; at that time I thought the disease was due to a micrococcus, which I found in between the starch cells in *jewary*, in the granary of the jail; I had also found it in pigeon's excreta from the roofs, and thought I had also found it in the blood and in pigeon's blood. But my series of experiments were open to considerable objection as regards method, as I have now learned. It was about the same time that a paragraph appeared in the *British Medical Journal* of the 24th September, 1898, concerning the connection between rice and beri-beri. It was not till coming to Rangoon in May 1900 that I had the opportunity of seeing more cases of beri-beri and of carrying out a series of experiments, which are now about to be described.

Working on the idea that beri-beri is a rice disease, of the various ways in which rice is brought into connection with the body, the one which appeared most likely to bring forward light on the subject was the rice liquors which are so largely consumed by the coolie classes of Rangoon.

Several bottles of different kinds of rice liquor, the congee, the brown rice-water liquor, and the white rice-water liquor sold for next

to nothing in the bazaars were given me for examination, and the organisms found therein were identical and were found to emanate from between the starch cells. Moreover, the same organism was found in damp rice, was also found in a pellet of yeast which the Chinese use to ferment rice-water with, and which they obtain from Singapore (refusing to tell what it is).

At the same time after prolonged examination of blood of beri-beri patients, which was obtained by a method to be described, the same peculiarly shaped organisms were noticed, and they were later found in the cerebro-spinal fluid and in the serous exudation in the sheath of the sciatic nerve *post-mortem*.

Cultures in sterile rice broth, in beef broth, in blood, in hydrothorax fluid, in ascitic fluid were made, and it was in these cultures that the morphology of the organism was observed.

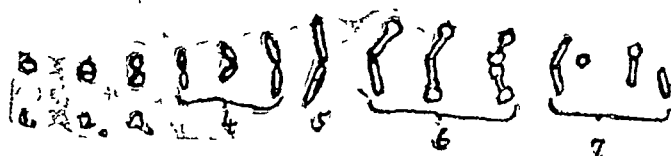
In carrying out controls of rice broth it was found that it was with extreme difficulty that the organism could be killed, and a temperature of 220°F. for nine hours was found to be necessary to kill off the spores.

Firstly, four cocks were injected intra-peritoneally from the cultures obtained from rice-water, and they all had reactions, though they recovered.

Then cultures from the cerebro-spinal fluid and from the blood in broth, in blood serum and in rice broth were injected into fowls, and the disease has been communicated to the fowls, the organism being found in the blood and in the spinal cord, the animals dying with the same peculiar symptoms.

A goat and guinea-pigs were also injected, and they are still under observation, as are other fowls.

The organism is a diplo-bacillus, which generally is seen as an angular organism; it develops by spores, the spores split into two, become elliptical and grow out into rods, so that the following different shapes may be seen from time to time.



Between the starch cells in rice may be seen micrococci (really spores) and occasionally the angular diplo-bacilli lying between the cells.

The organism is very active and moves along, wagging one rod in front of the other.

Double dumb-bells are seen, single knobs or rods, which have broken off in consequence of the heavy knobbed end of its partner.

Sometimes one of the rods points up, so that one thinks one sees a knobbed single rod, where-

as in reality it is only an angle sticking vertically up in the line of vision.

The organism is stained easily by carbofuch-sine. After growing on different media to some generations it alters in size considerably. It



I.

Organisms seen between the starch cells in rice.

multiplies with great rapidity, will grow best in rice broth, ascitic fluid, hydrothorax fluid, broth, blood serum, with difficulty or not at all on solid media, except coagulated blood serum.

To test its vitality a number of tubes of cultures in rice broth were put in the steam sterilizer and taken out every hour or half hour and placed back in the incubator. It was found that after eight hours at 220°F. with a slight increase of atmospheric pressure the cultures were still obtainable, but after nine hours the tubes gave negative results. After finding this out experiments were carried out afresh, and all the media used in cultures were sterilized for long periods.

The method I use in obtaining blood is by making glass pipettes with a long capillary pipette, a chamber, a second capillary pipette, and then a tube to fit a syringe on to, for suction.

The end is sealed in the flame, and the making of the pipette ensures its sterilization.

When required to be used, the end is broken off with forceps, a vein is made prominent and the skin prepared, the glass capillary is run

directly into the vein, if it gets well in the blood will flow, and for obtaining a perfect specimen it is well to allow the blood to flow a little through the tube, the pipette is then sealed at X. X., and the blood may be examined when convenient.

When examined, one end of the pipette is broken off, and the other is held near the flame; this sends out one drop from the open end, which is caught under a cover-slip held in,

iridectomy forceps. The cover-slip has been removed from alcohol and dried in hot air, not touched with anything but the points of the iridectomy forceps.

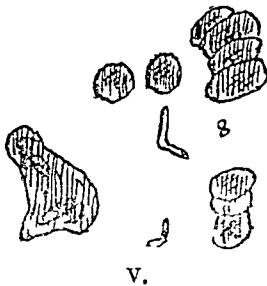
The cerebro-spinal fluid was obtained by the same method, a hole being drilled into the skull; the pipette was run straight into the lateral ventricles of the brain; in one case the cerebro-



The cover-glass is placed gently down and the specimen examined. I find 6th inch with No. 4 eye-piece all that is required, and after a very careful examination the organism in one of its morphological states will be seen; the most certain is the angular condition.

I have examined 32 cases of beri-beri by this method, on numerous occasions (three of these were *post mortem*). I have found the organism in every one of the cases on each occasion.

The veins of the foot were used at first, but now it has been found with equal success in the veins of the arm.



V.
From fresh specimens of
beri-beri blood.

A very careful examination of one specimen perhaps of one field for a long time will alone enable you to see the organism. I have watched small round bodies like those which are normally found in the blood and seen them to suddenly come up (the rod had been vertical).

Blood thus obtained and incubated for 24 hours at 37°C. is found afterwards to be full of the same angular organisms.

Blood thus obtained kept under a cover-glass



IV.
From stained specimen of beri-beri
incubated blood,

surrounded by vaseline has been watched, and the organisms have been watched increasing.

spinal fluid rushed out; in the other two it had to be drawn out by suction.

The heart blood has been always found to contain the organism.

The cerebro-spinal fluid obtained from the mid-dorsal region from a case of beri-beri was inoculated into:—

1. Broth.
2. Rice broth.



III.
Organisms sporulating, from
broth culture.

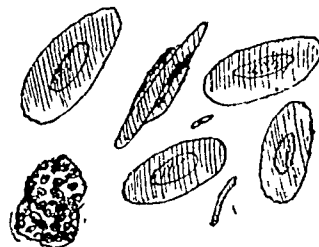
After 24 hours at 37° C. 1 and 2 were full of the angular diplo-bacilli.

One cc. of 1 was injected into the peritoneal cavity of No. 1 fowl by the pipette method and 1 cc. of 2, into No. 2 fowl. On the second day fowl No. 1 fell from 106.4 (normal) to 101.4; it was extremely ill and died on the third day.

Post-mortem nothing was found, but angular organisms in its blood and spinal cord.

No. 2 fowl died on the twenty-seventh day, gradually. It had been noticed to get thinner and thinner, although it fed well and its companion control fowl was well nourished.

It was then noticed that it could not run; on being forced to run it fell over or missed its footing; it also had a peculiar uncertain walk. Towards the end its temperature fell, it became very blue, refused to eat, fly or walk and stood



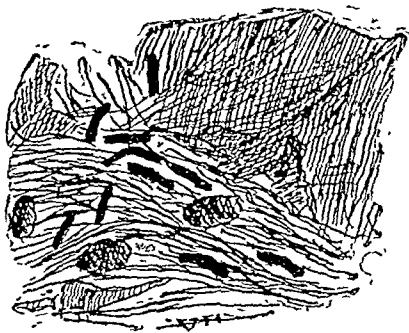
I.
From injected Fowl.

up on a stool in a curious attitude; it finally could not get up when turned over and died slowly.

The organism was found in its blood at stages during its illness, and the eosinophilous white

blood cells were very much increased, the white cellswere about 1 to 3 red.

Post-mortem.—The heart was enlarged; the kidney contained a cheesy matter which was found with the angular organisms.



VII.

Spinal Cord of Fowl.

The weight of the fowl before injection was 18 ozs., before death 10 ozs. 2 drms.

Fowl A was inoculated with cerebro-spinal fluid and fowl B with heart blood from a case of beri-beri.

Fowl B died on the twenty-second day, fowl A on the 23rd day.

The symptoms were identical with those in fowl No. 2.

Fowl B weighed 16 ozs. on admission and 10 ozs. before death.

Fowl A fell from 18 ozs. to 9 ozs.

The peculiarity in the wasting was that all tissues wasted equally, fat being present at time of death.

The control fowls were well.

Four cocks were injected from cultures made from rice liquor, and the temperature rose from 107° (normal) to 109–111° F. from the fifth to the thirteenth day; in one case there was a slight reaction and no rise of temperature. All the cocks appeared to be ill and had a defect in walking or running. They all recovered.

I visited a liquor shop in the town and examined the place thoroughly, the method of making the rice liquor is as follows:—The rice (probably full of these organisms as was the case in this instance) is steamed, and the rice is strained off, the water being allowed to ferment for three or four days, a pellet of the yeast they obtain from Singapore is added and half and half fresh rice-water, it is filled in bottles and sold.

The longer it is kept the better is liked. The pots are never cleaned out.

I examined the old pots in this shop, and took pipette samples and found them full of these angular organisms.

Only the poor coolies drink these rice liquors, and they are in the habit of taking the stale conjee (sour) on an empty stomach. Here I may mention that it is the Madrassee coolie who chiefly suffers from beri-beri; women do not get it so much and children rarely; the reason is

easily understood. Sepoys get beri-beri, and they are fond of this liquor in the early morning.

In the rice this disease appears as a fibrous clammy coating sticking the granules together.

If in a damp chamber some of this diseased rice and boiled distilled water is added, the angular organisms can be seen coming out into the fluid after some hours.

I have not yet ascertained or been able to ascertain if weevils have anything to do with this disease of rice or whether it is the result only of dampness.

That the explanation so likely in theory, appears only too evident in fact, and further experiment may complete the chain of evidence showing this to be the true cause of beri-beri.

The most important point is the vitality of the organism and calls for a better method of cooking rice in large institutions.

CAPTAIN ROGERS' RECENT INVESTIGATION ON MALARIA.

By RONALD ROSS,

MAJOR I.M.S. (RETD.), *Liverpool.*

AN abstract of Captain Rogers' recent epidemiological investigations on malaria was published in the *Indian Medical Gazette* for September. It is certainly an interesting paper, though it can scarcely be said to yield reliable conclusions. Captain Rogers examined the spleens of over 5,000 persons in the districts north of Calcutta and found that the percentage of persons with enlarged spleen was considerably smaller in the riverine villages than further inland, and was also much less in villages supplied with filtered drinking water than in the others. From this he concludes that there is "a very definite relationship between the drinking water and the amount of malaria, as judged by the spleen-rate in this alluvial area."

If these observations are confirmed by much more extensive investigations carried out in various parts of the world, they will tend to show that enlargement of the spleen is favoured by impure drinking water; but they will certainly not, by themselves, prove anything else. The mistake made by Captain Rogers is to suppose that the spleen-test is an accurate measure of the amount of malaria, pure and simple, in a locality. As a matter of fact enlargement of the spleen is a mere syndrome of malaria, which is largely affected by race, for instance, and possibly by other adventitious circumstances—such, let us say, as drinking water. Suppose for argument that this were actually the case, Rogers' conclusion would at once be vitiated. Can he show that it is not actually the case? In considering a question of such difficulty as that whether malaria is produced by other means than by mosquitoes, all possibilities must clearly be taken into account.

Consider some facts, for example. My regiment, the 19th M. I., at Secunderabad, suffered severely from fever in 1897. I used to spend the whole day in hospital studying the cases, and am quite certain of the fact. Yet, on an occasion when I was called upon to examine the spleens of the whole regiment for the purposes of an official report, I was astonished to find that, so far as I remember, not more than half a dozen of the men possessed enlarged spleens. I daresay the report can be still unearthed from the regimental archives—it was dated about August 1897, I think. In this case then Captain Rogers with his spleen-test would have declared the regiment free from malaria.* Again, in the Wilberforce barracks at Freetown, Sierra Leone, we actually found parasites in a quarter of the men taken at random. Yet very few of them had enlarged spleen. Indeed in the whole of Freetown, which has a perfect pipe-water supply obtained from mountain sources, there is very little enlarged spleen, though the place is a deadly one. In short, Rogers' researches do nothing more than fall in with a suspicion which many of us have held, that this syndrome is due to *something* plus malaria. I would advise consulting Daniels' careful work on the subject. Then, again, it must always be remembered that the enlarged spleen is an evidence rather of past malaria in the patient than of present malaria—compare, for instance, my *kala-azar* report. Lastly, innumerable instances have shown in many parts of the world (for example Freetown, and towns in Italy—compare Bignami) that malaria is *not* given by drinking water.

Rogers further adduces the admission rates in local dispensaries in favour of his statistics. But surely no one can have faith in such evidence! The popularity of the dispenser—anything—will affect these rates. As to comparing them with changes of season, he seems to forget that in localities when almost every one is infected from early childhood, the admissions may depend more on relapses due to wettings during sudden showers and similar causes than to fresh infections. Thus any military surgeon can observe that a route-march immediately brings on fever amongst a number of his soldiers! Does the route-march cause infection? The fact is that owing to the long-continued nature of a malarial infection, its numerous modifications and its relapses due to all kinds of causes, there is no disease in which statistics, epidemiological researches, ground-water estimates and so on are more likely to lead to error, and such are never very satisfactory methods of enquiry. To prove that malaria is carried by any other medium than by mosquitoes, the germs must be found in that medium; or the disease must be

actually produced by it under experimental conditions; or both must be done. Nothing else is likely to satisfy experienced pathologists nowadays.

The true test of what Daniels calls the *malariosity* of a place is certainly not the spleen-test, but depends on the average length of time which elapses before an immigrant into that locality contracts the disease. I always warn men against undertaking medical researches; but since Captain Rogers shows so much enthusiasm in this cause, he may permit me to suggest a modification which will probably make his investigations more useful. He should examine those commonest of immigrants, the local babies—as has been done with such effect by Koch, Christophers and Stephens (Royal Society Reports). He should compare the age of these at which the parasites begin to appear; the age at which they disappear; the corresponding enlargement of spleen; the percentage of local *anopheles* infected; and the conditions of environment. And, if I may make another suggestion, actuals rather than ratios should be given in his statistics, so as to enable the reader himself to judge regarding the value of each observation.

Rogers' finding *anopheles* larvæ in tanks and pools with fish in them is interesting. Evidence on the point is somewhat conflicting; and it is possible that the species of insects concerned may have to do with their habits in this respect. Rogers seems to think that I have laid it down as a law of universal application that *anopheles* never breed in tanks. If he will read my writings more closely he will find that in discussing the bionomics of gnats I have spoken from my own limited experiences only. In India my investigations were not exhaustive; while in Freetown there are hardly any large ponds with fish, and in these there were no larvæ. I know nothing of what may happen in places where I have never been.

The habit of imputing to a writer opinions which he has never expressed and has indeed often disclaimed, and of then demonstrating simultaneously the folly of these opinions and of the writer for holding them, is one to be guarded against. I have really never expressed the "ingenious suggestions," which Captain Rogers seems to think I have, regarding the possibility of exterminating *anopheles* from, let us say, the whole of Bengal! The utmost I ventured to suggest was that it might be possible to exterminate them from *some* large towns, cantonments and plantations, *under favourable conditions*. So I think it is; but I have always expressly excluded *large rural areas* from this suggestion. The idea that vast tracts, peopled only with natives, can be freed from any mosquitoes is too silly even to require a disclaimer.

* The regiment drank unfiltered well-water.

A REPLY TO MAJOR ROSS'S CRITICISM.

By LEONARD ROGERS, M.D., M.R.C.P., I.M.S.

At the suggestion of the Editor of the *Indian Medical Gazette* I send the following few lines:—

Major Ross does not think the spleen rate is a good test of the amount of malaria; in which opinion he differs from many Indian authorities, such as Dempster, Chevers, Taylor, Dyson, etc., while the observations of the last two observers on the reduction of the spleen rate, as a result of measures to remove water logging produced by the Western Jumna Canal, strongly support their view. As, however, Major Ross admits the possibility of a connection between the spleen rate and impure water being an explanation of the facts I have recorded, the point is of purely theoretical importance, for repeated blood examinations have convinced me that there is a definite relationship between enlarged spleen and the malarial type of anæmia and general ill-health in malarious places, so that if an improved water-supply will remove these, its introduction will have a greater effect on the health of the population than any feasible crusade against the mosquito; and my results retain all their practical importance. Major Ross's regimental experience, which agrees with my own, only confirms the well-known fact that slight fever, which is immediately and efficiently treated, as will be the case in native troops, will much less frequently cause enlargement of the spleen, than repeated relapses or re-infections in the less favourable situated general population.

Major Ross goes on to deprecate comparisons of fever rates with meteorological data, on the ground that admissions may depend more on relapses than on fresh infections—a factor I have myself laid stress on. Here again it may be admitted that the results of such inquiries may be of more practical than theoretical value, for on account of the great difficulty of appreciably reducing new infections in a malarious tract of country by the destruction of the mosquitos, a study of the conditions which predispose to the frequent and very injurious relapses is of all the more value as indicating the best times for successful prophylactic treatment; while they have the further advantage of being sufficiently simple to be profitably carried out even by such as myself, whom, Major Ross would "warn against undertaking medical researches."

It is to be regretted that Major Ross should have ended an otherwise very fair, if fatherly, criticism by incorrectly stating that I have misquoted his views. If he will read my paper a little more carefully he will see that I was fully aware of his admission that it is impossible to exterminate the mosquito from large areas, for I wrote—"We may hope with Ross to

at least rid towns or small areas of malaria," and again—"The importance of these observations lies in the impossibility of destroying all the mosquitos in even very small areas in Bengal, for the thirty tanks mentioned above all lay within an area of one-sixteenth of a square mile," being in fact a very small corner of Calcutta itself.

In kindly tendering me so much excellent advice Major Ross appears to have overlooked the fact that my orders were not to conduct a scientific investigation into the modes of infection in malaria, but to carry out a practical inquiry into the health of a considerable tract of country, while the results obtained still appear to me to strongly suggest, although they do not scientifically prove, that there is "a very definite relationship between the drinking water and the amount of malaria as judged by the spleen rate in this alluvial area."

SOME NOTES AND QUERIES ON MOSQUITOES.

By G. M. GILES, M.B., F.R.C.S.,
LIEUT.-COL., I.M.S.,
Civil Surgeon, Saharanpur.

THERE are several points in current recent literature on this subject that, it is desirable, should receive notice in the pages of the *Indian Medical Gazette*.

First of all there is Dr. Sambon's note on the attitude of *Anopheles*.

As regards that of the individual species *An. Claviger*, Fabr., no doubt Dr. Sambon is absolutely correct, for though I have never seen a living specimen of the insect, it must be remembered that is in many ways an aberrant member of the genus, and especially in the fact that, although the wings are spotted, this decoration is produced in a way characteristic not of the genus *Anopheles* but of the spotted forms of *Culex*, such as *C. annulatus*, Schraub, and *C. Spathipalpi*, Rond; the resemblance in the case of the latter species being additionally close, owing to the fact that in it the male palpi are clubbed, just as in *Anopheles*. In fact *An. Claviger* may be said to mimic *Culex* much in the same way that *C. mimeticus* masquerades as an *Anopheles*.

This last curious *Culex*, though rare, I have taken both in Naini Tal and here in Shahjahanpur; and I captured my specimens under the idea, from their attitude, that they were *Anopheles*. Under these circumstances, it is not surprising that *An. Claviger* should copy sitting of a *Culex*.

As regards the rank and file of the genus, however, there can be no doubt as to the value and accuracy of Ross' observation, and the exceptional behaviour of *An. Claviger* detracts but little

from its value; for, as far as I know, that species is confined to Europe, and hence can be responsible for but a small fraction of the world's malaria.

I daresay other species will turn up, but up to the present, I know as Indian, only of the four species described by me in my handbook, viz. :—

1. *An. Rossii*, Mihi. A small light coloured insect, edge of wings spotted, black on yellow ground, very close to *An. Superpectus* (Grassi) but, I understand, regarded as distinct by Mr. Theobald.

2. *An. fuliginosus*, Mihi. A small dark coloured species, with three good sized yellow spots on a dark edge of the wing.

3. *An. nigerrimus*, Mihi. A good sized very black mosquito with two minute yellow spots on the black edge of the wing, close to and possibly identical with *An. pseudopictus* (Grassi), but differing, I think, in the inner part of the wing, being freer from yellow dapplings than in that species, and in all the tarsal joints having minute apical bands.

4. *An. Lindesayii*, Mihi. A small dark insect with only a small yellow spot on the apex of the wing. Taken hitherto only in the hills and seemingly rare there.

I have observed all these four species alive, and in all the angular attitude of the sitting insect is most marked, and especially so in *An. nigerrimus*, which literally stands on its head, even when poised on a horizontal surface. We know too from Ross' observations in Africa that the same is the case with *An. Costalis* (Loew), and *An. funestus* (Mihi).

The customary sitting attitude of *An. Sinensis* (Weid) on the other hand appears variable. I have received this species on two separate occasions from Shanghai from Captain Victor Lindesay, I.M.S. I gathered from the context of his letter that the specimen first received presented no peculiarities as to habits. In the second specimen he, however, notes that he took it on a wall, on which it was sitting horizontally like a culex. In all species, however, the sitting attitude is not absolutely constant. There is an habitual attitude, but insects like other animals vary their postures, and the habitual attitude in the case of *Anopheles* is merely an expression of the fact that the middle legs are in most species disproportionately longer than the front legs. Captain Lindesay's captures show that the *Lancet's* (August 11th, p. 415) correspondent was erroneous in stating that there are no *Anopheles* in Shanghai.

2nd.—As regards the habitat of the *Anopheles* larva

Dr. Sambon remarks that in the case of *An. Claviger* the larvæ are essentially domestic, or, as Ficalbi would term them, "foveal."

In this matter my observations on Indian species are confirmatory and at variance with those of Major Ross. In my experience the

larvæ are commonest in pools or other collections of water near houses; and, in such situations, they are far commoner than the comparative rarity of the adult insects would lead one to expect.

In the rains they are extremely common in the small *pukka* tanks found in every compound in these parts, to facilitate the watering of the garden: often in company with *Culex* larvæ. It is, however, evident that a much smaller proportion survive to maturity. Doubtless they cannot endure the extremely foul water in which some species of *Culex* can thrive (I have found *C. fatigans*, (Weid) larvæ in *Nathdams*), but all the same I have met with *Anopheles* in distinctly foul water and in places where green algæ are by no means in evidence. Moreover, though pools corresponding to what Ross describes as the typical habitat are not uncommon in the rains, they are, in such situations, usually conspicuous by their absence. They are, however, so omnipresent in these provinces that I doubt if their destruction by larvicides comes within the "range of practical politics," except perhaps in exceptional communities as, e.g., in cantonments. My observations tend to show that they cannot develop in too warm water; hence their comparative rarity in the hot dry weather, in the very tanks, then swarming with *Culex* larvæ in which they will afterwards be found during the rains. In the "hot weather" here *Anopheles* larvæ are found only in exceptional situations, which for some reason or other are fed with fairly cool water and protected from the direct rays of the sun, e.g., in the pools resulting from the trickle of hydrants, in the deep shadows of a narrow Oriental street. Just now (November) in the N.-W. P., *Anopheles* larvæ are abundant in pools and garden tanks, but adult insects are hard to get; and, as far as I can judge, the development of the larvæ is arrested; for, in none of the pools can I find any pupæ, or at most but a few.

And now for my queries. What are the facts as to the seasonal prevalence of mosquitoes (a) as a family; (b) as regards the members of the genus *Anopheles*,—in different parts of India?

The acrimonious editorial remarks of the *Pioneer* as to a couple of letters of mine on this subject show in what extraordinary fashion the memory of the casual observer of daily surroundings may play him false when dealing with facts which he is not accustomed to observe closely. Here we have a presumably fairly intelligent and well-educated writer calmly asserting that mosquitoes are extinct in the rains and common in the cold weather in the N.-W. Provinces. Such a statement is such an inversion of common knowledge on the subject, that without exception everyone with whom I discussed the *Pioneer's* leaderettes commenting on my letter, argued that they could be only intended as a joke designed to

"draw" me; but the editorial comment at the foot of my second letter shews that this idea is erroneous, and that the writer of this ludicrous nonsense is perfectly serious. I made a tour during the past rains through the length and breadth of the N.-W. Provinces—from Saharanpur to Gorakhpur and from Bareilly to Jhansi, including a stay of four days in Allahabad, and it is almost superfluous to say that I found swarms of mosquitoes of all kinds present in every station I visited: as they always are, in every tropical climate, during the rainy season. It is equally well-known that wherever there is any distinct "cold weather" mosquitoes cease for the time to be troublesome.

Even in Calcutta I have found no need for a mosquito net in December, and here in Rohilkund already so few are left in an active condition that I only retain my net because I still meet with a few strong *Anopheles* fairly active. As a family few are to be seen, and the cold at night, even in the house, renders the few that have not gone into hiding so sluggish that they refuse to fly unless disturbed. Of course all this is a matter of such common knowledge that one is simply astounded to find the facts questioned; but under the circumstances it is extremely desirable that some few of your readers should state the facts as to the region with which they are acquainted, and especially as regards the Punjab. A few lines would suffice, but what is wanted is numerous communications from the various provinces.

Again, how do the species of *Anopheles* tide through periods such as the cold and very hot dry weather, which are unfavourable to their multiplication?

It has been suggested that either the larvæ or ova resist dessication and revive when the pool in which they are deposited is refilled at the next rains. As regards larvæ, such is certainly not the case, as I find they are not only dead, but decomposed long before the mud on which they have been left stranded is thoroughly dry.

What happens to ova I cannot say from direct observation, but I have repeatedly placed dried mud of puddles that had held *Anopheles* in water, and have never found any larvæ develop. Here again, however, we require as many workers as possible to record their observations, and especially as to the manner and situations in which *Anopheles* deposits her eggs.

Lastly, what are the causes that determine the intensity and virulence of different outbreaks?

As regards the first point it is obvious that it does not follow that *Anopheles* need be extraordinarily plentiful to produce a large crop of cases. A single infected insect may infect an entire family; although it would require many hundreds for each unit of the human population to make anything like the show of a "swarm"

of mosquitoes. What is required is a plentitude of the malarial parasite; and, given this a comparatively insignificant number of insects are adequate to produce a widespread outbreak.

As regards virulence of individual cases one would, *a priori*, expect to find the severe type associated with the malignant type of the parasite and with crescents, but we entirely lack very extensive observations on Indian epidemics, and must for the present confess that in the case of such an outbreak as that which has recently occurred in the Punjab, we do not know why the cases have been of so much severer a type than usual.*

Wanted observations!

A NOTE ON TWO CASES OF PERNICIOUS MALARIAL FEVER.

By J. G. McNAUGHT,

CAPTAIN, R.A.M.C.

THE following cases are not uncommon, but present some points of interest. Both cases illustrate the fact on which Koch has laid stress that the intra-corporal forms of the parasite of "summer-autumn" fever may be found in the peripheral blood days after any febrile disturbance has subsided,—*e.g.*, in case No. II, these forms were found on 3rd September, six days after, and ten days before, any febrile paroxysm. In the first case the patient had repeatedly suffered from malarial fever, and crescents were very numerous—two, three or four in each field. In the second case the patient had not previously suffered much from malaria, and before the attack recorded was in excellent health, stout and with a fresh, healthy colour. The present illness in the course of a week reduced him to a condition of typical malarial cachexia. The dysenteric diarrhœa, from which the first case suffered, appeared to me to differ from ordinary dysentery; in that the amount of blood was large and unmixed with fecal matter, the pain and constitutional disturbance slight, and the stools became normal immediately after the subsidence of the fever, without any tendency to relapse. Out of twelve cases examined during the present rains, the parasite of "summer-autumn" fever was found in eleven cases, and the parasite of "mild tertian" fever in one case.

CASE I.—Lance-Corporal R., aged 22; service in India 6½ years. Patient came to Deolali on furlough from Jubbulpur, where he had frequently had attacks of ague. He was admitted to hospital on 14th August 1900, suffering from fever and diarrhœa. He was extremely anæmic, and the

* For a further criticism of Dr. Sambon's views on the attitude of *Anopheles*, see *B. M. J.*, p. 1346, of Nov. 3rd, 1900.—Ed., *J. M. G.*

spleen was much enlarged. For three days after admission he suffered a good deal from retching and vomiting, and the motions consisted of blood and clear gelatinous mucus. There was very little griping complained of. Treated by quinine and saturated solution of sulphate of magnesia he rapidly improved, but extreme anæmia persisted. On 18th August the blood was examined, and a very large number of crescent forms and a few unpigmented intra-corpuscular amœbæ were found.

There was no return of fever while in hospital, but the anæmia persisted, and the spleen remained enlarged, though not to the same extent as on admission.

The blood was again examined on the 24th August; a large number of crescents and crescent-derived spherical bodies were seen.

He was discharged to attend hospital on 29th August.

CASE II.—Pte. J. B., aged 26; service in India two years. His medical history sheet showed no entries for malarial fever, but he stated that he had slight attacks of ague in Rangoon a year before the present attack.

He was admitted to hospital on 7th August 1900. He stated he had had slight attacks of fever on the two previous days, but had been able to perform his usual duties. The temperature, as can be seen from the chart, did not range high, but he suffered from most severe and persistent vomiting with pain in the epigastrium and great depression. The vomited matter at first contained food particles, but latterly consisted entirely of bile and mucus. The fever was of irregular tertian type. On admission he was suffering from diarrhoea, the motions being fluid and light yellow in colour. The retching was so constant and severe as to interfere with sleep. Quinine and morphia were given hypodermically; peptonized milk iced and a little brandy were given in the remissions of the fever: during the access vomiting was so persistent that no nourishment could be given except by nutrient enemata. He had attacks of fever on the 9th and 11th, and retching and vomiting persisted up to the 14th.

A profuse crops of herpes appeared on the lips and nostrils. The urine was very high coloured and contained bile pigment, and the skin and conjunctivæ became distinctly yellow.

The blood was examined on the 10th; a few unpigmented intra-corpuscular amœbæ, and one or two pigmented spherical bodies were found.

24th August 1900.—Convalescence very slow; patient extremely weak and anæmic; spleen enlarged and tender. There has been no return of fever. Blood examined: pigmented spheres, crescents, one flagellated body, and a few intra-corpuscular unpigmented amœbæ found.

On 25th, 26th and 27th August, slight attacks of fever occurred, preceded by headache and pain in the splenic region. No retching or vomiting.

3rd September 1900.—No return of fever since 27th August. Blood examined: a few crescents, one flagellated body, one pigmented intra-corpuscular amœbæ, and numerous intra-corpuscular unpigmented amœbæ found. The infected corpuscles were of a brassy hue.

9th September 1900.—Convalescing slowly; still intensely anæmic.

On 13th, 14th and 15th September 1900, he had slight attacks of fever; the temperature only rose to 100°.

24th September 1900.—Blood examined: no crescents, one small free spherical pigmented body; free pigment; a few unpigmented intra-corpuscular amœbæ found.

The patient has been treated by quinine, iron and arsenic, and has been generously dieted, but the anæmia is still intense.

NOTE ON THE MAL-TREATMENT OF MALARIAL FEVERS AND ITS CONSEQUENCES.

By DR. BHOOBUN MOHUN SIRCAR, L.M.S.

THIS formidable scourge, which has caused the ruin of so many mofussil towns and villages of Bengal and other provinces, first* made its appearance, in Jessore, some three-quarters of a century ago, making a sad havoc in that flourishing town. Within our recollection, it next appeared in the districts of Burdwan, Hooghly, Nuddea and the 24-Pergunnahs in the latter end of the fifties, devastating most of their prospering towns and villages, many of which were once renowned as sanitariums in Bengal. Later on it spread to Rungpore, Rajshahi, Dinajpur, and other districts.

Various theories have been advanced from time to time as to the causation of these fevers. Various means have also been adopted to improve the sanitary condition of these fever-stricken districts, in the way of clearing the jungles, improving the streets and drains, providing tank, well and filtered waters, excavating canals in lieu of their natural water-courses, which had been obstructed by railway and other embankments, and deepening drainage channels silted up in course of time. But it is a matter of great regret, that nothing or very little has been done, either by Government or the profession in the way of providing or suggesting proper remedies to check the progress of the fever in its chronic stage, which is so complicated in its nature and fatal in its consequences.

Quinine is the only medicine which has been found useful in checking the fever, and is accordingly used very largely all over the country, both by the profession and the people, in the acute or primary stage of the disease to check

* "First" Malaria is probably a disease much older than this century in India. Cp. History of Gaur, &c.—Ed., I. M. G.

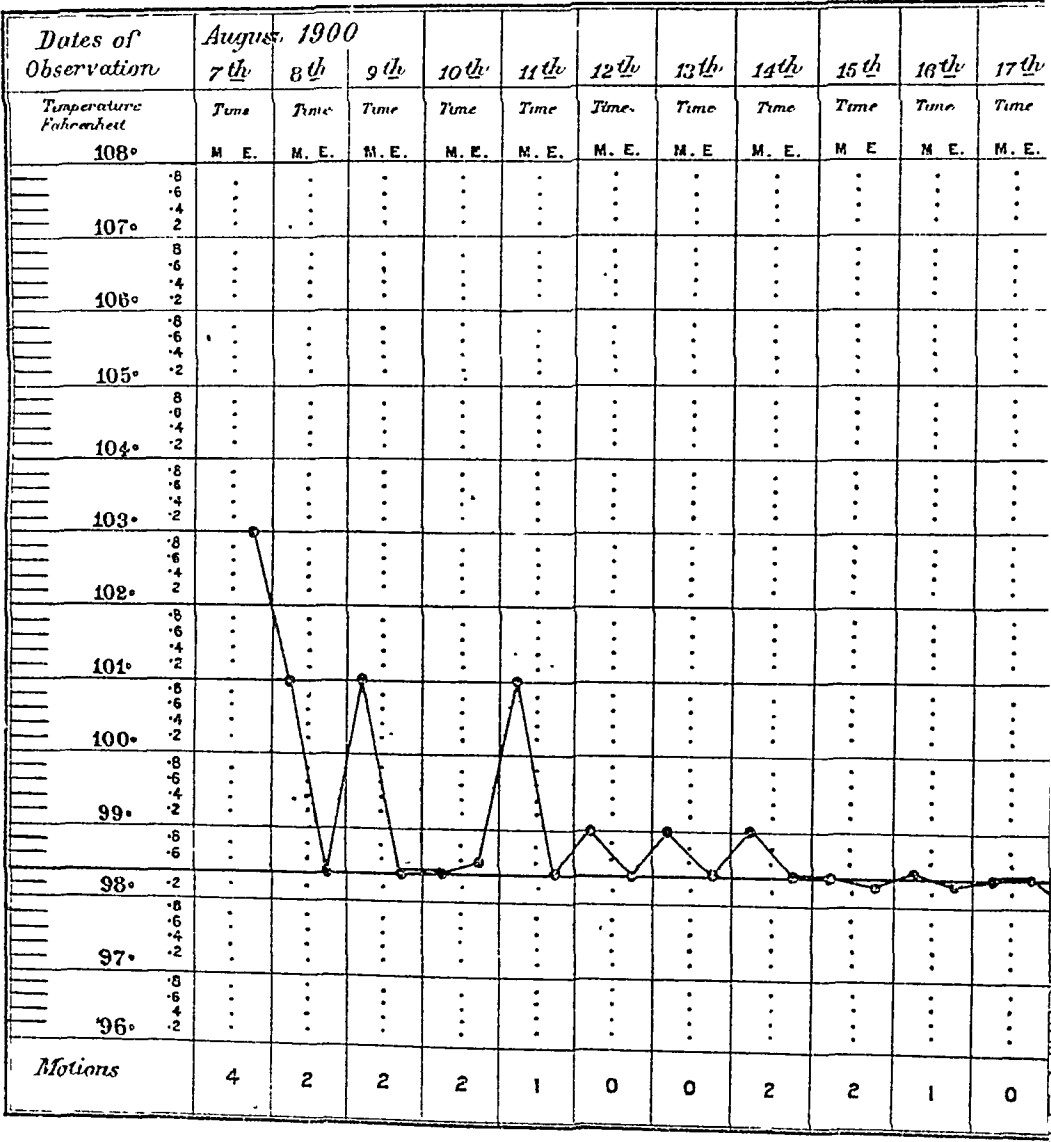
RECORD OF TEMPERATURE, PULSE AND RESPIRATION.

L/ Corporal R. Age 22. Service 7 Years and 6 Months. Disease Ague, Date of attack 13-8-1900.

Dates of Observation.	August 1900											
	13 th	14 th	15 th	16 th	17 th	18 th	19 th	20 th	21 st	22 nd	23 rd	24 th
Temperature Fahrenheit	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.
108°	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.	M. E.
.8
.6
.4
.2
107°
.8
.6
.4
.2
106°
.8
.6
.4
.2
105°
.8
.6
.4
.2
104°
.8
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99°
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.6
.4
.2
98°
.8
.6
.4
.2
97°
.8
.6
.4
.2
96°
.8
.6
.4
.2
Motions.	3	4	3	3	2	1	1	1				
	Blood and	mucus			no Blood							

RECORD

Pte. B. J. Age 1



1. *Service 4 Years. Disease Ague. Date of attack 7-8-*

[illegible]

the fever and prevent its recurrence. But in the rural districts, no regular or systematic treatment has been enjoined or followed in its chronic or secondary stage to check its progress and prevent the relapses, which are so frequent in these fevers. This is due partly to the want of proper medical aid in villages, and partly to the impoverished condition of the people, who can ill-afford to avail themselves of good medical treatment. This gave rise to the preparation of patent medicines, which could conveniently be used for days together without any doctor's advice. With few exceptions, quinine was made the staple ingredient of these medicines, combined with purgatives, iron and vegetable tonics. The large doses of quinine contained in them, promptly checked the fever, and the patients being satisfied with the efficacy and cheapness of the medicines, largely availed of them. Thus within a few years various kinds of patent mixtures, pills and powders, supposed to have anti-malarial properties came into existence and found a ready sale in the market all over the country.

In this way the injurious practice of mixing quinine, Epsom salts, iron and other ingredients, all in one mixture and allowing the same to be used in all stages of malarial fevers, both acute and chronic, has become very common and is much to be deprecated. The difference in the physiological actions of these different drugs and their respective effects on the system in the different stages of the disease are altogether overlooked. Their indiscriminate use has thus given rise to serious consequences. In the acute stage of fever with high temperature, iron acts as a poison; it suppresses the secretions, constipates the bowels and brings on congestion of the liver, spleen, kidneys and other organs. But at the same time it is one of the best tonics we have, in improving the blood and renovating the system when administered in the chronic stage when there is little or no fever. In treating a case of fever, surely no qualified physician will prescribe iron in its hot stage with thirst, scanty high-coloured urine, constipation, foul tongue and the more or less irritated condition of other organs, nor until the fever has left and the patient has become convalescent. But in using these patent medicines, the patients are obliged to take iron along with quinine and its other ingredients from the beginning of the fever, irrespective of its injurious action in the hot stage or until it has left. On account of its repeated use in that condition in every relapse which is so frequent, the liver and spleen become congested and enlarged, other organs become deranged, the condition of the patient becomes weak and anæmic, and anasarca, cachexia, and other fatal symptoms gradually supervene terminating in death. In the same way Epsom salts or any other similar purgative, which may do good in the first stage of the fever by clearing the

bowels, by its unavoidable continuance for days together till the bottle is finished, gradually brings on diarrhoea, dysentery and other complications.

This empiric and heterogeneous combination of febrifuges, purgatives, hæmatics, bitter tonics, &c., cannot therefore but be wrong in principle, injurious in action and fatal in its consequences. My long experience of malarial fevers in Bengal, extending over a period of nearly forty years, has convinced me of the undeniable fact, that much of the sufferings of the victims of malaria in villages is largely, if not wholly due, to the continued and indiscriminate use of these patent medicines, which in a manner augment and perpetuate the evils. Those who suffer most in this way are generally the poor and ignorant villagers living in rural districts. In their eagerness and anxiety to get rid of the fever, they buy a patent medicine which sells largely in the village, and after using it for three or four days, the fever subsides or altogether disappears, and they are delighted at the wonderful efficacy of the medicine, not knowing what baneful effects will subsequently follow from the poisonous action of iron and other contra-indicated ingredients which they have swallowed along with the quinine, which has checked the fever. Being relieved of the fever they resume their work, and after two or three weeks get a relapse, when they again take the same medicine, the fever subsides in three or four days as before, and they go to work again, each time in a more exhausted condition than before. As a rule, a few relapses yield to the same treatment. In this way suffering from frequent relapses and using large doses of quinine and iron every time in the course of high fever, they become more and more weak and enervated, the liver and spleen become enlarged, emaciation follows, dropsy supervenes, vital power comes down to its lowest ebb, and they are reduced to the living skeletons, so frequently to be seen in fever-stricken districts.

It is generally believed that enlargements of the spleen, which are so much noticeable in their various stages of slightly, moderately and excessively enlarged among the poor population of malarial districts, are caused by frequent relapses of the fever, and I may unhesitatingly add that the repeated and indiscriminate use of iron and other injurious ingredients in all stages of the fever is another potent factor in enlarging these organs and gradually leading to fatal consequences. Observation has also proved that the percentage of enlarged spleen in the riparian districts is far above than the percentage found in inland districts, and the reason of it is not far to seek. It is the poor and ignorant villagers residing in the out-lying rural tracts that largely consume these patent medicines, and are consequently the greatest sufferers with enlarged spleen and liver.

The use of these patent medicines has unfortunately become so popular that, notwithstanding all this mischief of human suffering and death, which has been going on for the last 40 years, the voice of reason has never been raised to question its righteousness. However palpable the cause may be, perhaps it would be blasphemy for any one to attribute the evil to these favoured bottles, pills or powders, which have such a magnetic charm over the poor and ignorant sufferers.

I cannot be too strong in my assertion, that the effects of these patent medicines are more formidable and injurious and less amenable to treatment than those of the malarial poison itself. It is far more difficult and hopeless to cure diseases with complicated symptoms brought on by mal-administration of medicines than in their simple state.

With the few exceptions of patent medicines professed to be made up of indigenous vegetable drugs, the bulk of them are prepared with the same medicines, which are recommended and used in our therapeutics for the treatment of malarial fevers. But the mischief lies in the injurious practice of mixing all of them in one mixture and using the same as a panacea in all stages of the disease, irrespective of the conditions in which each of the medicine is indicated.

Such is the insidious way, in which these patent medicines are sapping the vitality of the fever-stricken people of this country, augmenting their sufferings and hastening their death. I think it is high time that the public attention should be called to this lamentable state of things, with a view to bring about a change in the policy, principle of preparation and the mode of administration of these medicines. The first and simple improvement suggested would be to separate the medicines according to their respective modes of action, instead of combining all in one mixture, and secondly, to administer them separately according to their indications in the different stages of the disease. Such an innovation on approved principles will be a boon to the country, and every effort should be made and encouragement given to its adoption.

It may be news to the general public that these patent medicines, instead of curing these fevers, have been aggravating their symptoms, bringing on serious complications, and causing death after prolonged suffering. But it is a matter of great regret, that such a widespread practice has escaped the attention of the profession and especially of responsible medical authorities, who have made malarial fever a subject of their special study and enquiry. One word of warning from them in time would have nipped the evil in the bud, and saved the sufferings and lives of thousands and thousands of the fever-stricken people. However, it is a hopeful sign, that the more intelligent portion

of these sufferers from their practical experiences are fast losing their faith in these medicines. Be that as it may, and however strong the current of popular opinion may be in favour of these patent medicines, I feel very strongly in the matter and deem it my duty to express my views on the subject for the benefit of suffering humanity, and risk the courage of my conviction without any fear of contradiction.

With these few remarks, I leave the matter in the hands of the profession and the sanitary officers for proper investigation, and to find out means to check this evil practice.

TWO CASES OF INFANTILE SCURVY.

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THE following notes may be of interest from the comparative rarity of the diseases and the unusual fatal ending. V. P., Eurasian female, *æt.* three-and-a-half years, admitted to the Presidency General Hospital, April 22nd, 1900. The mother said the child had been feverish and ailing for about one month. On admission the child was anæmic and emaciated. Purple patches of effused blood in the skin and subcutaneous tissues were noticed on the flexor surface of the forearms and front and back of the thighs. The child was very feverish and irritable and cried at the least movement of the limbs. She lay on her back with the legs extended, everted and motionless. The tongue was coated, the gums ulcerated and bleeding readily on slight pressure, and exhaling a horrible fœtor. Physical examination of the chest revealed nothing abnormal. The spleen was enlarged downwards to the level of the umbilicus, and the liver could be felt about $1\frac{1}{2}$ finger breadths below the costal margin. The temperature on admission was 100° F., and diarrhœa, with greenish offensive stools, was present.

No improvement took place on treatment, and the child gradually sank and died on the 3rd day, April 24th. No *post-mortem* examination was obtainable.

The case was complicated by chronic malaria, and death was due to the general state of debility.

A. M., European, male, *æt.* eleven months, admitted April 24th, 7 P.M., with a history of teething troubles and failing health for some weeks. The parents stated that they had been living in Assam, and milk being difficult to get, the child had been brought up on patent foods and preserved milk chiefly.

On admission the child was noted to be fairly well nourished. Pulse frequent and weak. Temperature 101° F. Four upper incisors and two lower had been cut, and the gums of the base of them were swollen and spongy. Res-

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piration was quick. The lower part of the sternum was depressed; the mother had noticed this condition for fifteen days. The right leg and thigh was swollen and motionless, the left thigh also a little enlarged. After admission the temperature rose slightly. The child vomited all nourishment, was sleepless and had two or three attacks of dyspnoea, in one of which it succumbed nine hours after admission. A physical examination of the organs revealed nothing abnormal beyond some rhonchi over the chest generally, and fine crepitations at the base of the lungs. A *post-mortem* examination was made eight hours after death.

External appearances.—The body was well nourished. The chest presented a curiously flattened appearance as if the whole sternum had been dislocated backwards or its costal articulations; this was more noticeable at the lower part. The gums at the base of the teeth were purplish in colour and swollen.

The lower end of the right thigh was occupied by a uniform fusiform enlargement. The right leg was also uniformly swollen, presenting a cylindrical or sausage-like appearance. The left thigh was swollen like the right though less so.

On removing the integuments, some ecchymosis was found in the tissues covering the fourth and fifth costo-sternal articulations. The appearance of backward dislocation was confirmed, and on opening the costo-sternal articulations the cancellous bone was soft and easily broken down and infiltrated with dark soft blood clot.

The organs were normal in size and appearances, with the exception of a few congested patches in the lungs. On handling the right lower extremity, soft indistinct crepitus in the neighbourhood of the knee joint was felt. The joint was opened and found to be quite normal. A longitudinal incision was made through integuments and tissues over the front of the femur down to the bone. The muscle was pale, and there was some effusion of blood into the tissues beneath it which were cedematous.

The periosteum was thickened and separated from the shaft of the femur to a point a little above the middle of the bone, by a quantity of soft dark gritty blood clot which contained shreds of fibrous tissue and bits of soft newly formed bone detached from the shaft. The femur was quite bare and deeply blood stained, and coated with a layer of soft gritty newly formed bone detached by effused blood here and there, and more particularly at the lower end, which presented an eroded appearance on the surface.

The lower epiphysis was separated from the diaphysis at the epiphysial line, and the space was filled with dark clot containing many translucent bodies about the size of grass seed. The cancellous tissue broke down readily under the pressure of the fingers.

An incision over the right tibia revealed the same condition, the diaphysis lying loose bathed in dark soft gritty blood clot, separation having occurred at the epiphysial line as in the femur.

The left femur was in the same condition as the right; the changes had not extended quite so far up, nor was the separation of the epiphysis and diaphysis quite complete though readily produced artificially.

The left tibia was normal with the exception of a little ecchymosis at the epiphysial line. The ends of the radii also presented the same ecchymosis; the humeri and bones of the skull were not examined.

There were no rachitic changes, though these were carefully looked for.

Remarks.—Infantile scurvy or scurvy rickets is not, I believe, often seen in India. If the etiology of the disease be considered, the explanation of the fact is not far to seek. Fresh milk is easily obtainable, while the condensed variety and artificial foods deficient in salts, are from their expense beyond the reach of the poorer classes, and, therefore, rarely used as substitutes. Given, however, the necessary conditions of improper food as in the second case, the disease is producible readily enough in India as elsewhere. The chain of evidence is being complete in this case, the parents volunteered the information without entertaining the slightest suspicion of the rôle artificial foods had played in the production of the child's illness. The prognosis is, as a rule, most favourable under suitable treatment. Both these cases were, however, in the latest stages of exhaustion when admitted to hospital. No. 1 case was complicated by chronic malaria, which perhaps should be looked upon as the primary disease, while the scorbutic condition was really an intercurrent affection.

Pathologically it is interesting to note that the epiphysial line is the earliest site of the scorbutic changes, ecchymosis being visible at this spot before the periosteum of the shaft of the long bones showed any sign of being affected, where the whole bone was affected as in the right tibia the changes by softening of osseous tissue and extravasation of blood were most extensive at the junction of the diaphysis and epiphysis. The depression of the sternum from implication of the sterno-costal articulations is not mentioned in Clifford Allbutt's System of Medicine; it is given as a more or less constant feature in well marked cases by Barlow in his original description of the disease. Case No. 2 was almost typical, with the exception of the absence of hæmorrhage into the lax tissues of the eye-lids or "black eye." Clinically speaking the diagnosis in a typical case should not be difficult. As such cases, however, are rarely seen, the existence of such a condition is somewhat liable to temporarily escape the memory of the observer. The spongy condition of the gums if looked for

would at once conclusively point to the true state of affairs. The "black eyes" and painful swollen condition of the limb or limbs might at first suggest violence, of which the sign of crepitus might only serve to enhance the degree. The history of the case, if considered reliable, would of course be against this, and the extent of the swelling and absence of superficial injuries would negative it, too. The diagnosis from infantile paralysis is clear from the swollen and enlarged state of the limb, though at the first glance the lax motionless and powerless condition might be suggestive of the complaint. Lastly, acute periostitis might occur to the mind of the observer, and rise of body temperature, as occurred in case 2, would not tend to simplify matters. The history of gradually failing health, of progressive increase in the local condition, coupled with the absence of heat and tension locally and any acute febrile rather constitutional symptoms generally, negative this condition.

The earlier stages or lesser degrees of the affection are not so easily recognised, but vague pains, tenderness and some loss of power in or disinclination to move the limbs, should put the observer on his guard with regard to the possibility of a scorbutic taint. The dyspnoæic condition noticed in case 2 was, I think, due to failing vitality, the partial dislocation of the sternum may have been a factor in the production of it, but how far I am not prepared to say.

PYORRHŒA ALVEOLARIS OR SCURVY.

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I SHOULD like to offer a word of explanation in regard to the following paragraph which appeared in the September issue of the *Indian Medical Gazette*. The paragraph referred to is:—

"Major Andrew Buchanan, of Nagpur Jail, raised the question and claimed that the condition of pyorrhœa alveolaris, so common at that time in certain jails, was due to scurvy and produced by lack of vegetables. We challenged that opinion at the time, and this year we notice in the Central Provinces Jail Report that this condition of the gums was kept under control by a free use of the tooth-sticks and charcoal tooth powder."

The report referred to was written by Mr. Acklom who is not a medical man, and I do not think it was his intention to convey that no cases of spongy gums are due to scurvy. In the small book which I published last year I drew attention to the fact that "spongy gums" were more prevalent during or after the famine, and they were more prevalent in those districts in which the famine had been most severe, and

I said "it is clear that the famine has had in some way an influence in its causation, but how that influence has acted is not so certain."

In the chapter on the Relation between Spongy Gums and Scurvy I showed—

(1) That there had for over 20 years been constant differences of opinion between medical officers as to the nature and causes of the spongy gums which were found in jails.

(2) That no attempt had been made to classify the different kinds of spongy gums according to the causation.

(3) That if there are different causes of this condition it is essential, first of all, to differentiate these different varieties.

(4) That the different varieties may be classified into four groups:—

(a) Those due to scurvy or malnutrition.

(b) Those due to mercury.

(c) Those due to want of attention to cleaning of the teeth.

(And I said that in this class might be included cases which have had scurvy, but in which the gums had not returned to their normal condition owing to want of cleanliness, although the general scorbutic condition may have been cured.)

(d) Other causes (I need not refer to now).

Referring to group 3, I said at pages 32 and 33:—

(C). "When the gums have become spongy and ulcerated, the retention of particles of decomposing food and tartar may keep up the unhealthy condition even though the health of the man may have become otherwise good. My reasons for holding this opinion are, that in the great majority of cases which have been recently seen, there has been a great improvement in the gums after treatment with antiseptics and special attention to cleanliness. It may be said by those who hold that the disease of the gums is the result of dirt and want of attention to cleanliness, that this rapid improvement after local treatment is a proof that the softening of the gums is a purely local disease. But if dirt be the cause, how can the excessive prevalence of the disease since the famine began be accounted for? It would be necessary to assume that the people have recently been less cleanly in their habits than they were formerly. Besides, an ordinary scorbutic ulcer heals very much more rapidly if the ulcer is carefully dressed according to the regular surgical principles, and in the same way we should expect an improvement in the mouth if we give attention to the local conditions and remove anything of an irritating nature. General treatment is essential, and as the ordinary diet of the jail is an antiscorbutic diet, the general treatment is supplied as a matter of course. Local treatment is very important, but the rapidity of the cure under local treatment should not lead us to look on the disease as a purely local disease."

I then drew attention to one practical point, *viz.*, that if as a matter of routine, we cure all cases of pyorrhœa, we should then be able to say clearly and without doubt or fear of contradiction whether a given case is scurvy or not.

Now, although in the year 1899 we had no cases of scurvy, the conditions in the present year have been very different. The water-supply was so short that at one time a question arose as to whether there would be a sufficient supply of water for drinking purposes. There was for some months only a very small supply for the garden, and under the circumstances it

might be expected that scurvy might make its appearance. As a matter of fact, there have been several cases of spongy gums which were undoubtedly due to scurvy. The teeth of all prisoners have been very carefully cleaned, and all cases of pyorrhœa have been cured, so that there was no difficulty in saying for certain that these cases were due to scurvy. Fresh meat was issued regularly, and the gums improved rapidly. What has happened in this year is then a proof of the importance of the fact that I pointed out last year, *viz.*, the necessity of at all times curing pyorrhœa alveolaris.

THE PROCEDURE ADOPTED IN THE PLAGUE RESEARCH LABORATORY, BOMBAY, FOR STOPPERING THE PLAGUE PROPHY- LACTIC BOTTLES.

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Experiments on india-rubber and ordinary corks as to how much time these take for sterilizing after immersion in Formalin lotion (2 p. c. strength).

THERE are two sorts of the india-rubber corks, as supplied for the use of the Plague Research Laboratory. The one, that is the larger sized, is used for 30^{cc}. bottles. These are harder and tougher, and sit more easily on the bottles than the smaller variety (that supplied for 20^{cc}. bottles) which are soft and pliable. The specific gravity of the material used in making the larger corks is higher than the smaller ones.

The latter float in water, while the former do not. This perhaps may be due to the proportion of sand, &c., used in their manufacture.

The rule in the Laboratory is to dip the india-rubber corks three full days in formalin lotion (2 p. c. strength) before they are used. The formalin solution, it appears, has a tendency to more or less harden the substance of the corks, whether ordinary or india-rubber, besides making them sterile. A series of experiments were made in order to ascertain how much time formalin takes to sterilize the corks, both india-rubber and ordinary, and it has been found that three hours' complete immersion in formalin solution 2 p. c., for the india-rubber, and two days for the ordinary corks, renders them aseptic.

For carrying out these experiments two dozens india-rubber corks and a dozen of ordinary corks were taken and tested in broth—inoculating two tubes (each containing about 20^{cc}. of broth) at every test, and the following results were obtained:—

	1st day.	2nd day.	3rd day.	*4th day.	REMARKS.
I.-R. corks undipped in Formalin ...	Contaminated	—	—	—	* 72 hours incubation in the dark room were found sufficient time to show contamination, if any, in broth.
„ immersed for 15 minutes...	No growth	No growth	Contaminated	—	
„ „ „ 1 hour ...	No growth	No growth	Contaminated	—	
„ „ „ 3 hours ...	No growth	No growth	No growth	No growth.	
„ „ „ 1 day ...	No growth	No growth	No growth	No growth.	
„ „ „ 2 days ...	No growth	No growth	No growth	No growth.	

When carrying on the tests on the ordinary corks, the corks were tested as whole and as cut (aseptically) in order to ascertain whether the

inner substance of the corks becomes as sterile as the surface. This was necessary on account of their porosity.

	1st day.	2nd day.	3rd day.	4th day.	REMARKS.
Corks undipped ...	Not examined.	Contaminated	—	—	
Corks uncut, dipped for 3 hours ...		No growth	No growth	Contaminated.	
„ cut ...		No growth	Contaminated	—	
Corks uncut dipped, for 1 day ...		No growth	No growth	Contaminated	
„ cut ...		No growth	No growth	Contaminated.	
Corks uncut, dipped for 2 days ...		No growth	No growth	No growth.	
„ cut „ „ ...		No growth	No growth	No growth.	

N.B.—Before inoculating each tube the cork was taken out aseptically and formalin well shaken off from the surface. A very inappreciable quantity of formalin must have remained with the corks.

In the experiments summarized in the above tables, two tubes were inoculated each time of testing; and if even only one showed contamination and the other no growth, the result was noted down as "contaminated."

Among the india-rubber corks for 20^{cc}. bottles, some corks were found coated with a very thin reddish-brown material; but these were equally sterilizable with the clean corks.

The use of the ordinary corks for bottling the plague prophylactic has been discontinued since the arrival of the English bottles of measured capacity. But whenever there is an occasion to make use of these corks, the practice is to sterilize them in water at a pressure of one additional atmosphere for one hour consecutively on two days, and on the third day to transfer them in formalin lotion (2 p. c.) and keep them for three days similarly as in the case of the india-rubber corks. At the time of stoppering the bottles the (ordinary) corks are dipped in paraffin at 160° and then fixed over the bottles, the neck of the bottle being wrapped in parchment paper which has been kept soaked in carbolic lotion (1 in 20) and then sealed with paraffin. For india-rubber corks these operations are considered unnecessary as the cork can be fixed airtight without further operations.

NOTE ON THE PREVALENCE OF THE ANKYLOSTOMUM IN CALCUTTA.

(FOR THE I. M. G. COLLECTIVE INVESTIGATION.)

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DURING the last five months I have carefully counted the number of ankylostoma found in *post mortems* at the Calcutta Medical College. The method adopted was to wash out the contents of the small intestine with a strong stream of water, which is passed through fine muslin, and what is retained by it is then examined in a thin layer of water in an enamelled basin, and all the worms picked out. On opening the intestine any remaining in it can be then easily found and counted. The great majority of the worms are found in the washings except when the *post mortem* is made within a few hours of death, when many may still be found to be attached. By this method few worms are likely to be overlooked.

The results were as follows:— Out of 59 bodies examined the ankylostoma were found in

44 or 74.6 per cent., while they were absent in 15 or 25.4 per cent. From 1 to 10 worms were found in 24 cases; from 11 to 20 in 7; from 21 to 30 in 6; from 31 to 50 in 2; and over 50 in 5; the numbers in these last five cases being, 88, 93, 138, 76 and 80 respectively. Two of these last five cases had died of cholera, and in only the one with 138 worms was there reason to believe that the worms were a definite contributory cause of death. The average number of worms present in those bodies which harboured them was 23.2, or in the whole series 15.2. In fourteen cases of cholera the average number was 14.1, and in six cases of phthisis it was 14.8, so that the numbers were practically the same in both the acute and the chronic affection and in the whole series.

In the same series of 59 cases round worms found were in 25, in numbers varying from 1 to 10. The trichocephalus dispar was found in four cases, and four bothriocephalus latus in one case of cholera. No flukes were found in this series so that they appear to be less common in Calcutta than they are in Assam.

With regard to the ages of the patients an analysis of the figures available shows that between the ages of 20 and 39 they were present in 21 cases and absent in six, while between those of 40 and 65 they were present in ten and absent in six, so that they appear to be met with more commonly in the earlier age period. The number of cases at earlier ages were too small for comparative value, but they were found in two patients of the ages of 15 and 18 respectively, and were absent in a child of 4. There was little difference between the two sexes, not sufficient to be of any importance in such a small number of cases.

These results agree very closely with those previously obtained by the late Dr. McConnell, of Calcutta, nearly twenty years ago, and afford no support to Major Giles's statement as to the "waxing and waning of helminthic diseases." The frequency of these worms in the inhabitants of such a crowded city as Calcutta is also somewhat surprising if the same author's view that these parasites gain the access to the intestinal canal in earth is correct, for if such was the case, they should be more common in villages than in towns.

These results, then, once more confirm the frequency of these parasites in persons dying of all kinds of disease, while even cholera does not appear to remove them, and emphasise the necessity of great caution in accepting their mere presence as evidence of serious disease produced by them, it being obviously necessary to prove that they are present in larger numbers in any special disease than in the ordinary inhabitants of the district, before they can be considered the cause of any increased mortality due to that special disease.

THE WIDAL REACTION IN THE DIAGNOSIS OF TYPHOID FEVER: A RESUME OF WHAT IS KNOWN ON THE SUBJECT.

By P. S. CHANDRA SEKAR, B.A., M.D.

(Continued from page 433.)

Historical.

GRUBER AND DURHAM utilised the reaction to diagnose unknown bacilli by known sera; but did not think of doing the reverse. And this is the more remarkable when it is remembered that as far back as 1892, Chantemesse and Widal had advanced the view that the serum of typhoid patients acquired protective powers even before the establishment of immunity.

Delepine justly attributes the credit of discovering the sero-diagnosis of typhoid fever to Widal for the following reasons:—

- (1) Widal was not acquainted with the work of Grunbaum and was working independently.
- (2) His results were fully published nearly two months before Grunbaum's theses (in which Grunbaum went completely into the subject).
- (3) Widal's results were more reliable and were the result of much more extended experience.

Widal has himself established his claims to the discovery of the "sero-diagnosis of typhoid fever" in the *Lancet* of 14th November 1896 (p. 1371). No doubt great credit is due to Grunbaum also for having arrived independently at the same results as Widal.

Although the credit of discovering the sero-diagnosis of typhoid fever belongs to Widal it would not have been possible for either Widal or Grunbaum to make the discovery if the way for it had not been paved by Charrin and Roger, Metchnikoff and Bordet, and Gruber and Durham. Scientific discoveries must always be attributed to the concerted efforts of a number of investigators.

The Reaction.

If a drop of a young bouillon culture of the typhoid bacilli or a drop of emulsion of a young agar-agar culture made with water or bouillon be examined under the microscope, the bacilli are seen to be extremely motile. They are characterised by violent darting movements. However long the slide be kept under observation, these movements do not cease.

But if a young bouillon culture be mixed with a drop of serum from a typhoid patient and be subsequently examined under the microscope, certain characteristic changes take place. If the serum be a very active one, the first glance through the microscope will reveal the completed reaction; almost all the bacilli being aggregated together in clumps and nearly or almost motionless, and the inter-spaces containing few or no isolated bacilli.

If the serum be less active, a few small clumps will be seen, while the bacilli in the inter-spaces will be moving sluggishly about for some time till they join these clumps or form new clumps and then lose their motion altogether.

(To be continued.)

A Mirror of Hospital Practice.

CARCINOMA OF THE PENIS.

NOTES ON EIGHT CASES OF ENTIRE REMOVAL BY PEARCE GOULD'S METHOD.

By A. HOOTON,

CAPTAIN, I.M.S.,

Asst. to Civil Surgeon, Poona.

I PROPOSE to detail two cases which presented some unusual features somewhat at length, and to give a summary of the remainder.

(1) K. D., Hindu, 70 years, admitted on 26th July 1900, spare, but not unhealthy in appearance, looks his age. There is a foul-smelling ulcerated growth about 3 inches diameter, involving the whole of the glans, and presenting a typical cauliflower appearance. The meatus is obliterated, and he passes water through a small fistula in the ulcerated mass. The lymph glands in both groins are slightly enlarged.

The history is not consistent or reliable, but the growth appears to have been rapid, and the commencement recent. There are no signs of syphilis; he admits an attack of gonorrhoea many years ago.

As far as can be ascertained the other organs are normal; urine is not obtainable in an uncontaminated state for testing.

On 30th July 1900, the patient, having been free from fever and in fair health, was anaesthetized with chloroform. The entire penis was removed by Pearce Gould's method, a tube was laid in the whole course of the floor of the wound, the wound was dusted with iodoform and sutured.

After course.—For 4 days there was very little discomfort, and the wound appeared clean and healing well. Urine was passed voluntarily at normal intervals; he took food well, and the temperature after the first day was slightly sub-normal.

On the 5th day there was marked dysuria, and urine was observed to be bursting open the healing superficial wound. It was found that the end of the urethra had sloughed away from its attachments, and a soft rubber catheter was passed with some difficulty. From this time the wound became unhealthy, the edges

sloughed, and the surface was soaked with urine. Diarrhoea and cystitis set in, and in spite of astringents, the regular passage of a soft catheter and washing out of the bladder, he gradually sank and became delirious. The temperature rose slightly, but never above 101°. Death occurred on 18th August 1900.

(2) N. K., Hindu, 27 years, admitted on 28th July 1900, looks about his age and well nourished, and appears in good general health. There is a foul-smelling and ulcerated growth, involving the greater part of the glans and the corona, but not extending to the meatus. The tumour projects from the glans in a flattened form, somewhat resembling a mushroom, and is about 2 inches diameter. Slight enlargement of lymph glands of groins. The temperature is normal, and there is no sign of other disease.

He gives a history of gonorrhoea and a soft chancre with a bubo about a year ago; no distinct interval seems to have existed between the chancre and the new growth. There is no history of malignant disease in the family.

On 1st August 1900 chloroform was administered, and the operation performed.

After course.—There was a rigor on the evening of operation, and the temperature was above normal for five days after. During the same period he was troubled with diarrhoea, and there was dysuria on the second and third day after operation, to relieve which a catheter had to be passed. With these exceptions the progress was satisfactory; the wound healed quickly and well, the superficial part almost entirely by first intention. He was discharged cured on 29th August 1900.

(3) B. D., Hindu, about 40 years, a large typical epithelioma, with granular ulcerating surface. There was a slight evening rise of temperature for five days after operation. The wound healed very rapidly, and he was discharged cured on the 18th day.

(4) R. G., Hindu, 60 years. In this case there was some diarrhoea, and tenderness over both spermatic cords; the temperature rose slightly on the second and the ninth day after operation. He was discharged cured on the 29th day.

(5) R. R., Hindu, 50 years. The growth was covered by an expanded foreskin, and contained about 12 calculi, the size of millet seed, imbedded in it. The wound healed slowly. He was discharged cured on the 49th day.

(6) K. R., Hindu, 25 years. The growth was typical, and involved the whole of the glans. There was a slight evening rise of temperature for eight days. Discharged cured on the 32nd day.

(7) M. H., Hindu, 45. A slight evening rise of temperature for three days. The wound healed well, and he was discharged cured on the 31st day.

(8) An old man in a very emaciated and cachectic state. The growth had involved the

whole of the penis and spread to one spermatic cord. The testicle of that side was removed. The wound was almost healed at the 5th week, when he suddenly died.

In this case it seems fair to assume that death was due, not to the operation, but to the man's general condition, and perhaps a secondary deposit in the pelvic glands. No *post-mortem* examination was obtainable.

In 1898 Captain J. B. Smith, I.M.S., performed the same operation on a patient of middle age. It was successful, and the man was discharged cured after about a month.

Remarks.—Except in cases (1) and (2) there was no difficulty in micturition after the operation. The wounds healed superficially for the most part by first intention. An annoying feature in almost all the cases was the tendency of the patient to withdraw the tube in his sleep; the re-introduction was somewhat difficult, and disturbed the wound.

With reference to the question of recurrence, the successful cases are all too recent for any observations to be of much value; the months of discharge were respectively November 1898, January 1899, April 1899 (two cases), May 1899, and August 1900. None of these have returned to hospital, nor has the case operated on by Captain J. B. Smith.

In all these cases the inguinal glands were slightly enlarged, but resumed their normal size after operation, the enlargement being evidently due to irritation.

In view of the special characters of carcinoma of the penis, it seems to me that total removal of the organ is the best treatment as a rule. The disease spreads rapidly in the cavernous tissue, and breaks down early, while, on the other hand, the glands do not appear to be often involved, and the patient's chance of recovery after a radical operation is good. It is noteworthy that in this small series there was no case in which the disease had not made considerable advance, and in some cases, it would have been difficult to obtain a sufficient stump for the ordinary flap operation. As regards the operation, there are one or two points which one may perhaps mention; as Captain Smith pointed out to me, it is an advantage to remove the growth as a preliminary, after transfixing the penis with a needle and applying an elastic ligature above it. This ligature does not interfere with the passage of a staff and the urethra is more readily found. The operation area can then be cleaned with a better prospect of success than when in proximity to the ulcerating mass.

The median incision should extend to a point about 2 inches from the anterior margin of the anus, and thus lies over only about 1 inch of the triangular ligament. While separating the halves of the scrotum some dilated veins are often divided, but the only difficulty in arresting

hæmorrhage is met with when the arteries of the corpora cavernosa and the dorsal arteries are cut. These, as they emerge from the triangular ligament, are sometimes awkward to secure, but in none of these cases has there been any bleeding after the operation.

TEN YEARS' SURGICAL WORK IN THE KASHMIR MISSION HOSPITAL.

By ERNEST F. NEVE, M.D., F.R.C.S.E.

Amputations.

(1) *Gangrene*.—Of 103 major amputations for disease, 52 were for gangrene. The causes of gangrene were various, tight bandaging by native bonesetters, neglected compound fractures, frost bite, arteritis obliterans, other constitutional causes and traumatism.

The least favourable of all from a surgical standpoint is the rapid spreading gangrene with or without a history of injury. Of three deaths, two were after amputations for this condition.

CASE I.—Asgar Ali, *æt.* 45, male, gangrene of left leg extending above knee. No line of demarcation. Crepitation under the skin up to Poupert's ligament. Temperature on admission 103.8°F. Amputation upper $\frac{1}{3}$ rd of thigh by Dr. W. F. Adams, May 2nd, 1894. On May 4th the other leg showed signs of gangrene, and as his condition was hopeless, his friends removed him.

The third death was after a Syme's amputation, performed by Dr. R. W. Ashton on a leper with a foul ulcer of the left foot, with commencing gangrene. The patient was very feeble. Tetanus set in the next day, and he died in the evening.

The following has been our usual practice with regard to gangrene:—

(1) Where the condition is due to constitutional causes of a persistent character, either a late amputation is performed, above the line of demarcation, or the gangrenous part is simply separated, the dead textures alone being removed.

(2) In gangrene from frost bite we wait for a good line of demarcation and amputate sufficiently high above to secure a good stump.

(3) Where the gangrene depends on some temporary constitutional condition the rule is to wait for a line of separation and until the health is improved.

(4) Gangrene from strictly local causes such as tight bandaging usually shows a distinct line of demarcation, and amputation can be performed at once.

(5) Rapid spreading gangrene with or without some initial traumatism is best treated by prompt amputation. This, however, is rather a forlorn hope. The case of Asgar Ali is illustrative of this.

Amputation is essentially a life-saving procedure. This is sufficiently obvious in connection with gangrene, but is still more evident in the treatment of joint disease. If the mortality from bone and joint disease in a given hospital is too high, we may well enquire as to whether amputation is performed sufficiently early and often. The same applies to compound fractures. In these days of antiseptic surgery the temptation to save limbs in the face of even great odds is very great. Conservative surgery may be carried too far. How many limbs saved are to be balanced against one life lost? Is it fair to try to save a patient's limb in a bad case of compound fracture or knee-joint disease if one's experience and hospital records show that in similar cases one life in ten (or even in twenty) is sacrificed? These and kindred questions can only be decided by a careful study of a large number of cases.

(2) *Joint disease*.—During the past ten years, 517 cases of disease of large joints have been treated in this hospital. Of these eight died without amputation. The causes of death were as follows:—

Extraneous (cholera, etc.) 2; debility, 4 (two of these were infants who died of diarrhœa); hip-joint disease, 1; elbow-joint disease (excision), 1 (a boy *æt.* 8). The hip-joint case was a girl of 13, and the disease supervened on necrosis of the femur. Amputation was refused, and the patient was removed no doubt to die. Amputation was performed for joint disease in 28 cases. Two deaths occurred.

CASE II.—Rahima, *æt.* 19, male, acute osteomyelitis left tibia involving knee-joint. Temperature usually 103°F. Abscesses thigh and leg; admitted December 16th, 1893. Amputation above knee advised.

Patient did not consent until December 26th, when the operation was performed by Mr. Arthur Neve, although there seemed little hope of a favourable result. Death almost occurred on the table. On the second day part of the anterior flap sloughed. The temperature was still 100°F. On December 30th secondary hæmorrhage set in. The femoral artery was tied and transfusion performed, but the patient died on December 31st.

CASE III.—Abundon. Suppuration, knee-joint with total necrosis of the tibia. Both epiphyses were affected. There were abscesses in the thigh and calf. The knee was distended by foul pus. I amputated through the lower $\frac{1}{3}$ rd of the thigh on June 16th, 1899. The operation, including dressing, took 18 minutes. The patient did fairly well for ten days. An abscess then developed in the hip joint, another in the sterno-clavicular joint and diarrhœa set in. He died on July 2nd, 1899.

Death after amputation may indicate better surgery than death without. Given a case in which recovery of a joint is hopeless, amputation may save. Experience and rapid operation

increase the percentage of recoveries. Unfortunately certain cases, such as those detailed above, are almost hopeless. This is partly due to their being brought into hospital too late.

(3) *Bone disease.*—Seven hundred and twenty-eight cases of necrosis or caries of long bones have been operated upon in the Kashmir Mission Hospital during the past decade—of these two died; both were infants. One was suffering from acute pyæmia on admission and died a few days later. In the other there was an enormous subperiosteal abscess of the femur complicated by malnutrition and diarrhœa which proved fatal. *Amputation was not once performed for bone disease in which joints were unaffected, and there was no compound fracture.*

(4) *Compound fractures.*—These are relatively uncommon in Kashmir. Fifty-one cases were treated in ten years. Of these, six left hospital, being unwilling to submit to what they considered irksome treatment. Six amputations were performed, one died.

CASE IV.—Compound fracture of tarsal bones, crushed by a mass of stone. The patient was a man *æt.* 40. Immediate amputation was pressed but declined. Some days later consent was obtained, and the operation performed; but tetanus set in the next day and proved fatal. This case shows incidentally how little is to be hoped from amputation in tetanus. The operation was performed with all the usual antiseptic precautions. No doubt the tetanus poison was already in the system. Amputation so far from averting appeared to precipitate disaster.

In analysing the deaths after amputation we find that two were due to tetanus, two to rapid spreading gangrene, one to pyæmia existing at the time of admission, one to exhaustion and diarrhœa in a case in which amputation was too late, and one to secondary hæmorrhage in a septic case.

Thus five cases (including the two tetanus) died from septic causes connected with their original disease, one died of hæmorrhage and one of debility.

In no less than six, owing to the opposition of the patient's friends, or to the case being brought in too late, the amputation was done at a period when the chances of recovery were greatly diminished.

The following table shows seven deaths in 250 operations, giving a mortality of $2\frac{1}{2}$ per cent. After subtracting the minor cases we have 109 major amputations left with a mortality of just under $6\frac{1}{2}$ per cent. There was no death on 26 major amputations of the upper extremity, and no death on 141 minor amputations.

Our returns for 1890 to 1900 show a diminution in mortality of 1 per cent. on all

amputations and $1\frac{2}{3}$ per cent. on major amputations, as compared with the preceding eight years.

Table of amputations performed in the Kashmir Mission Hospital during the ten years, 1890 to 1899.

	Number.	Recovered.	Died.
I. For disease—			
(a) Upper extremity at—			
(1) Shoulder joint for gangrene arm ...	1	1	
(2) Arm for gangrene ...	8	8	
sarcoma ...	2	2	
epithelioma ...	2	2	
elbow joint disease ...	2	2	
(3) Elbow joint for gangrene ...	2	2	
sarcoma ...	1	1	
(4) Forearm for gangrene ...	2	2	
epithelioma ...	1	1	
sarcoma ...	1	1	
(5) Wrist for gangrene ...	1	1	
epithelioma ...	2	2	
(6) Hand (partial) for gangrene ...	1	1	
TOTAL ...	26	26	
(b) Lower extremity—			
(1) Thigh for diseased knee-joint ...	11	9	2
necrosis femur ...	3	2	1
gangrene ...	5	3	2
diseased stump ...	1	1	
sarcoma ...	3	3	
(2) Knee joint for sarcoma leg ...	1	1	
(3) Leg for gangrene ...	11	11	
sarcoma ...	4	4	
epithelioma ...	1	1	
leprosy ...	2	2	
caries ankle ...	7	7	
ulcer ...	1	1	
diseased stump ...	1	1	
(4) Ankle for gangrene foot ...	10	9	1
caries ...	2	2	
tubercular diseased foot ...	2	2	
carcinoma ...	1	1	
(5) Tarsus for gangrene ...	6	6	
tubercular disease ...	4	4	
epithelioma ...	1	1	
TOTAL ...	77	71	6
(c) Minor—			
Fingers and toes for necrosis, gangrene or tubercular disease ...	116	116	
leprosy ...	1	1	
sarcoma ...	1	1	
epithelioma ...	2	2	
supernumerary fingers ...	9	9	
TOTAL ...	129	129	
II. For injury—			
(a) Upper extremity at—			
(1) Elbow joint ...	1	1	
(2) Hand (partial) ...	1	1	
TOTAL ...	2	2	
(b) Lower extremity at—			
(1) Thigh compound fracture... ..	2	2	
(2) Leg " " ...	1	1	
(3) Tarsus " " ...	1	0	1
TOTAL ...	4	3	1
(c) Minor—			
Fingers and toes ...	12	12	
GRAND TOTAL ...	250	243	7

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THE DIRECTOR-GENERAL'S NOTE ON
JAILS.

WE have always looked upon the annual note on the sickness and mortality in the Jails of India as a very useful and important document. It is the only official report published which attempts to review the Jails of India as a whole; in the reports made to the Local Governments attention is necessarily directed to purely local conditions, and the views therein put forward may or may not have a merely local significance. The annual review by the Director-General is able to avoid this "note of provinciality," and is thereby the more valuable.

The note now to be reviewed is one of special interest, and touches upon many points of much importance to the Civil Surgeon.

It is in the first place satisfactory to notice that it is recorded that, "if we extend our observations to the records of the last twenty years, we find that there has been a fairly consistent advance in the control of the causes of sickness and mortality in nearly every provincial group of jails." An analysis of the returns moreover clearly demonstrates the fact that the chief causes of sickness and mortality are malaria, dysentery, tubercle and pneumonia.

The Director-General next goes on to say, that all of these are in varying degrees amenable to the resources of preventive medicine, and if we are to attack these diseases with any hope of success, it is of the first importance to have accurate diagnosis.*

We cannot, however, do better than quote in full the following extract:—

"Our success in the campaign against the disease causes that may fairly be accounted preventible, largely depends upon our recognition of them as specific pathogenic processes. The history of enteric fever and of

[* As an extreme example of faulty diagnosis the following may be given.—carelessness could not be worse. One jail in a small province, which need not be further specified, returned cases in one month this year as having died from the following diseases (1) *e.g.*, "bradycardia," "thrombosis," and "hyperæmia." We may add that the Inspector-General of Jails in this Province is not a medical man.—ED., I. M. G.]

tubercle in Europe well exemplifies this fact. It is clear that the only road to any marked and abiding success in dealing with the chief causes of sickness and death in our jails lies by the way of careful clinical and pathological research, together with the application of the practical measures indicated thereby. In India the recognition of the specificity of enteric fever has been followed by the discovery of the causes of relapsing fever, malaria and cerebro-spinal meningitis. The recent introduction of the serum sedimentation tests for enteric and Malta fevers has equipped us with a sure means of differentiating these from the mass.

As regards the bowel-complaints which annually claim such a large tribute in health and life, a like success probably awaits the application of similar methods of clinical and pathological research. It is to our jails that we may reasonably look for this; and while the adoption of the proposal, put forward in my last note to establish small laboratories in each Central Jail will go far to provide facilities for the more refined scientific effort, it must be affirmed that careful clinical work is as essential, and that in this respect there is still something to be desired; something that lies in the power of every medical officer to contribute.

To judge by the returns of some Superintendents, there is a tendency to assume that nosology is of minor importance; but a correct diagnosis is the first essential alike in the interests of the patient and of the public health. The necessity of early and thorough clinical examination, and in all fatal issues, complete and critical *post-mortem* observation is generally recognized, but the reports afford evidence that there is still room for improvement in this respect on the part of a minority of medical officers.

Meanwhile it is doubtful if the knowledge gained in recent years as to the natural history of some of the specific infections, has been utilized to its full extent in its practical bearing on prevention. As regards malaria perhaps the one practical step taken has been the issue of quinine and cinchonidine as prophylactics. Considerable expense has been incurred, but to-day we are almost as far off as ever from the ability to form a conclusive judgment as to its value. The reports on the subject from the great majority of jails present the vague opinions or impressions of medical officers in place of facts.

Into all the conditions that should be observed in an investigation of this kind, *e.g.*, as regards drug, dose, method of administration, choice of subject, etc., I need not enter, but it is obvious that sound deductions can only be drawn by the institution of a control experiment, by dividing the population into two approximately equal and homogeneous parts, and by administering the prophylactic to one-half exclusively. The question is of great importance both on the score of health and expense, and in my opinion no further trial should be made save under the simple but rigid conditions of a scientific experiment. But we may well go beyond this. We have little or no control at present over the foci of malaria outside the jail and its precincts, and probably every man admitted has already been infected, and is thus a source of infection for

subsequent attacks in himself and others. Nevertheless we may surely interfere with effect at one or other point of the chain of causation as revealed to us in the light of recent researches.

Observations as to the kind of mosquitos and of their larvæ, which prevail within the jail and in its immediate surrounding would entail very little expense of time and trouble. The simple distinguishing characters of the genus anopheles are readily mastered, and each medical subordinate should learn to recognize these. Attention should be directed to the stagnant collections of water likely to favour their development and a few observations month by month, in every jail in India would soon provide valuable epidemiological data, which along with their scientific interest in helping to confirm, or to suggest the inadequacy of the latest theories, would give practical indications in regard to the most effective and economical use of prophylactics, and other preventive measures. We have much to learn regarding the distribution of the host of the parasite, along with the different types of fever and the seasonal prevalence of both.

The note also deals with the question of the increase of tuberculosis in the jails of India—a subject we have discussed in our September issue, and it is clearly shown that much of this apparent increase is due to more careful diagnosis, where tubercle has increased in the returns, a decline is to be found in the cases returned as “anæmia” and “debility.” We have often protested against the retention of the absurd term “debility” as the name of a disease, and we would like to see its use absolutely forbidden. As for anæmia, it is too often a slipshod diagnosis, and its use should be guarded by orders that where used, a full note should be added giving reasons for the use of the term. The Director-General makes an admirable suggestion that cases of tuberculosis might be transferred to a special jail—just as with lepers, and wards should be specially devoted to them and every endeavour made to treat them on modern lines. The remarks on dysentery and diarrhœa are also valuable, but we have not space to quote them, the great importance of early treatment, and of prevention by increased attention to cooking are measures which have also been formerly urged in these columns. It is also pointed out that a high chemical nutritive value of a jail dietary is not in itself enough,—theoretically the prisoners are overfed, so that it is the amount of food that is assimilated that is the main question, and herein cooking is all important.

We have quoted enough to show the value of this Annual Note, we recommend our readers

to peruse it for themselves in the *Gazette of India*. We may in conclusion hope that the threats which hang over the existence of the note may come to naught, and that among many reports which might be removed with advantage this admirable annual purview of the sanitary conditions of the prisons of India may be permitted to remain.

THE RAJPUTANA MEDICO-TOPOGRAPHICAL HISTORIES.

WE have received two volumes of the series of monographs which are being written under the general editorship of Colonel T. H. Hendley, C.I.E., I.M.S., by the medical officers of the various charges in Rajputana. The first of the two volumes before us is a “General Medical History of Rajputana” by Colonel Hendley himself, which fitly acts as a preface to the whole series. Knowing the author’s long service in and many services to the States of Rajputana, we were led to expect a very interesting volume, and in this expectation we have not been disappointed. The first chapter is devoted to a general description of the province, its population, meteorology and climate. The sanitary state of the dwellers in the rural villages is described, and Colonel Hendley remarks that the fact that a healthy and well formed peasantry is reared in the midst of such an environment much strengthens the theory of immunity or filth tolerance, which the writer of our London Letter recently protested against. It is also incidentally noted that in spite of a recent theory that cancer is due to meat eating, the Jains and Bunniahs of Rajputana who rarely touch flesh would seem to suffer as much as the others. The volume has very full chapters on the meteorology of the State and records for many years back are quoted. Chapter V is entitled “Medical History of Rajputana,” and begins by a description of the various indigenous systems of medicine which flourish in the Province. The next chapter traces the history of the dispensaries of Rajputana and gives an interesting summary, with many quotations, of the Annual Reports from that of Dr. Ebden in 1856 to the year 1896. Many interesting references are made to the prevalence and treatment of diseases, *e. g.*, where Dr. Ebden states that he did the operation of “depression” for cataract because the natives feared the knife so much. It is probably those who have had

experience of cataract operations before the introduction of cocain that can alone realise fully what a difference it has made.

In the year 1864 we read of a severe epidemic of what is called "yellow fever," which disease, however, does not appear to have any connection with the "yellow jack" of the West Indies, but was probably a severe form of malarial fever with jaundice as a part of the resulting cachexia. Space forbids us to quote from other interesting extracts from the reports of Sir Wm. Moore and the present Surgeon-General Harvey, and especially about their early efforts to popularise vaccination in these States. Dr. Harvey in 1870 wrote on the prevalence of mycetoma or fungus foot and its surgical treatment without amputation, an opinion with which both Sir William Moore and Colonel Hendley agree. In the same year it is said that no less than 75 per cent. of patients were suffering from malarial fever; this, as Colonel Hendley remarks, is a startling refutation of the assertion that salt marshes and their neighbourhood are not productive of malarial fevers. At the time of the Opium Commission, it was not obscurely alleged that many officers who gave evidence which was not acceptable to the anti-opium party did so from a desire to support the Government rather than from a conscientious belief in the comparatively harmless effects of opium, yet here we find a most interesting note from a report by Sir Wm. Moore, written in 1871, in which he stated his opinion that its moderate use was beneficial, "though like alcohol it might be abused." An interesting *résumé* of these reports and the deductions which may be drawn from them is appended to the statistical table of diseases for twenty years. Colonel Hendley recalls attention to his paper at the Medical Congress at Calcutta where he showed to what a large extent respiratory diseases are responsible for sickness and mortality, especially an asthenic form of pneumonia. Another chapter deals with the subject of insanity; it is noted that general paralysis though not unknown, is very rare among these peoples.

In Chapter 9 a short account is given of the various epidemic disease which have prevailed in Rajputana, *e.g.*, cholera, smallpox, etc. It is noted that enteric fever is more prevalent than is usually suspected, and typhus fever has several times appeared. The early history of plague is sketched, and a very interesting letter,

written in 1836, is given in full, which gives an account of the great Pali epidemic of plague. This is followed by a minute by the Lieutenant-Governor of the N.-W. P., dated 1837, which if the date is not looked at might well read for one of the numerous resolutions on plague which recent years has made us only too familiar with. Other chapters deal with the history of the local jails, and a complete list of the Agents and Medical Officers of the Agency are given. The volume concludes with a very complete and valuable bibliography of Rajputana.

The above account will serve to give our readers some account of the numerous matters of interest in this volume. Colonel Hendley, it is well known, has done much for Rajputana, and the publication of this series of volumes will have the effect of carving his name all the deeper into the annals of Rajasthan.

We have left too little space to do justice to the next volume in this series. It is a medicotopographical account of Ajmere, and is written by Lieutenant-Colonel Pank, I.M.S., the present Residency Surgeon of Jaipur, with additional notes by the present Civil Surgeon of Ajmere, Lieutenant-Colonel D. French-Mullen, I.M.S. It is unnecessary to follow it chapter by chapter, as it follows the lines of the volume already reviewed, and is of similar interest. Accounts of the Alwar and Bikanir States and of the Deoli Irregular Force have already been published.

We can congratulate the Editor on the publication of these very valuable histories. The work of future medical officers will be considerably lightened by having these volumes to refer to.

We commend them to the attention especially of those Medical Officers in Bengal who are now busy compiling similar histories of their districts, and we can only say that if (as we expect) the Bengal Medical Histories turn out as successful and interesting as are those of Rajputana, Medical Officers will have no reason to regret the time and labour they have spent in making them.

THE DISCUSSION ON STONE.

We publish in this issue a very interesting paper by Mr. Herbert Milton of Cairo on some points raised in our special stone number. Mr. H. Milton, we all know, has always been on the side of the angels, and Indian operators have for years past looked to him as the chief supporter of the operation of litholapaxy out-

side of India. It is for this reason especially that we welcome his friendly criticism. Mr. Milton at the same time has sent us a box containing specimens of some of the large stones he has operated on in Cairo. These are as follows:—Three stones $4\frac{1}{2}$ oz. weight removed by Mr. Milton's perineal operation, and classed respectively as hard, medium and soft; then come four of 5 oz. or just over, four of which are called hard and one soft; next are four stones of six ounces and over, two hard and two medium, the medium ones were removed by urethral litholapaxy and the two hard ones by the perineal operation; then follow three stones of 7 oz. and over, two soft removed by the urethra, and one hard removed by the urethral route; then follows a 9 oz. stone, medium, removed by the urethra; and one $12\frac{1}{2}$ oz., also medium, removed by the same route; another of 14 oz., of medium consistence, removed by Mr. Milton's perineal operation, and a 16 oz. stone, of hard consistence, removed by the urethra.

It will be admitted that these stones are all decidedly large, and in the hands of the English school of operators would certainly have been subjected to the dangerous suprapubic operation. We publish in our Correspondence columns the opinions of Major J. A. Cunningham, I.M.S., of Delhi, and of Captain Henry Smith, I.M.S., of Jullundar, to whom we submitted the stones for opinion. In Major Cunningham's opinion, the stones sent by Mr. Milton as specimens of "hard" stones are correctly so described, and he makes the important suggestion that it is not improbable that when *débris* weighing these amounts is removed at one operation there are more than one stone present in the bladder, as used often to be the experience in old lithotomy days. The interesting letter from Capt Henry Smith in parts deals with more personal matters, as to criticism made on and replied to by Mr. Milton. He also points out that Mr. Milton must not suppose from reading the Hyderabad figures that Keith's operation has become anything like so common in other parts of India as the Hyderabad figures seem to indicate. It was perhaps natural that in Hyderabad, where Forbes-Keith made this distinct advance in the Surgery of Stone, that his operation should have been largely performed, but Captain Smith's statistics showed that for all ordinary cases of stones of moderate size, litholapaxy is *par excellence* the operation of election in India, for larger

stones he advocated Forbes-Keith's operation, and for still larger stones a further modification in which the prostate is slightly incised and the giant lithotrite used. This limited use of Keith's operation is also advocated by other writers in our stone number, as Lieut.-Col. Henderson, I.M.S., Major Baker, I.M.S., etc. (who are all expert litholapaxists) for specially large or hard stones. The question of the future in regard to stone is, as Dr. Keegan pointed out in our November issue, how best to deal with large stones, the superiority of urethral litholapaxy for ordinary uncomplicated stones has been admitted even in England, and the contest now is around the relative merits of the suprapubic operation or a *perineal operation through a small wound and the removal of the stone in fragments*, for large stones. In England Mr. Cadge and the Norfolk experienced surgeons, together with surgeons of little or no stone experience, are in favour of the suprapubic operation. All surgeons in India, Mr. Milton in Cairo and, we understand, Mr. Reginald Harrison in London, are in favour of the small perineal wound and the crushing or breaking of the stone through that wound. Therefore, we look upon Mr. Milton as being on our side, though the details of his perineal operation differ considerably from either Keith's operation, or the use of the giant lithotrite.

The experience of Mr. Milton in Egypt and of all surgeons in the stone districts of India is strongly in favour of litholapaxy and perineal litholapaxy and lithotrity as opposed to the suprapubic operation, and not even the experience published by Dr. Zum Busch (to which Dr. Keegan has conclusively replied,) (*British Medical Journal*, October 13th) of a Russian Surgeon's records in suprapubic lithotomy will lead us in India to believe that this operation can ever rival those advocated either by Egyptian or Indian experience. When a crushing operation is possible what patient will submit to the cutting one, and surely a small perineal wound, with crushing of the fragments, is preferable to the large wound necessary to remove a large stone by the *sectio alta* as it used to be called?

LONDON LETTER.

THE MALARIA EXPERIMENTS.

IN a former letter I referred to two crucial experiments which had been proposed by Dr. P. Manson for the purpose of testing the truth of the mosquito theory. In one persons free

from malarial infection were to spend a malarial season in a malarial locality in Italy, and adopt no other precaution than protecting their bodies from sunset to sunrise from the bite of the anopheles. This arrangement has been carried out by Drs. Sambon and Low—so far with complete success. A similar experiment on a larger scale has been devised and made by Professor Grassi, the subjects being railway employes living in the malarious plain of Capaccio near Salerno in South Italy. In addition to protection from mosquito bites, persons who had previously suffered from malarious fever and were liable to recurrences were dosed with quinine. The inhabitants of neighbouring places were watched with a view to obtaining a control experience. The result of the proceedings is stated by Professor Grassi to have been "that the protected individuals all escaped being affected by malaria, while those unprotected all suffered from the disease even when they lived in houses in better conditions." The other experiment consisted in young mosquitos (anopheles) being fed on persons suffering from tertian fever in whose blood the mild tertian parasite was ascertained to be present. These mosquitos were transmitted to London, and two volunteers—Mr. P. Thurnburn Manson, a son of Dr. Manson's, and Mr. George Warren, Assistant in the Laboratory of the London School of Tropical Medicine—permitted themselves to be bitten by them. Both these gentlemen after an incubation period of about fourteen days suffered from attacks of pyrexia exhibiting marked periodicity and characterised by the well known symptoms of ague. Parasites were found in their blood of the same description as those present in the blood of the persons on whom the mosquitos had been fed. Both these experiments have thus given positive results, and have contributed important if not final support to the truth of the mosquito theory.

NEW EDITION OF DR. MANSON'S BOOK.

The necessity of issuing in 1900 a second edition of a work on Tropical Diseases originally published in 1898 indicates how rapidly progress is being made in the study of maladies peculiar to hot latitudes. Without adding much to the bulk of this excellent handbook Dr. Manson has contrived to introduce into it a considerable amount of new material, and has brought it thoroughly up to date. No better

book exists in any country or language on the subject, and the author is entitled to the thanks of all medical men whether practising in the tropics or elsewhere for placing at their disposal such a concise, practical and thoroughly scientific work.

THE OPENING OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

Among the introductory addresses and other functions which were recently delivered and held at the commencement of the winter session Sir William MacGregor's address at the London School of Tropical Medicine takes a conspicuous place. Sir William has had wide and well used experience of tropical diseases both as medical officer and administrator, and his speech on this occasion was full of wise and interesting observations. He has watched the advent of infections to places which had hitherto been exempt from them and noted the remarkable severity of type and great mortality which characterised these outbreaks. This is by no means a novel experience in geographical pathology; but the instances and illustrations which he supplies are fresh and striking. The introduction of measles into Fiji in 1874 and its disastrous consequences are ancient history, but the appearance and spread of itch, of tinea imbricata, enteric fever, venereal disease and dysentery on virgin soil are curious and interesting facts. Dysentery appears to have among imported diseases presented the most formidable aspect. It is represented as prevailing epidemically and being spread by contagion, and reported in some instances to have caused a mortality of from 50 to 75 per cent. among Polynesian labourers. Sir William MacGregor entertains very pronounced views regarding the malignity of dysentery. "From my own personal experience" he avers, "I should say, that dysentery causes more deaths than any other disease in tropical countries." Holding this view it is not surprising that he declares that "the man that will work out an effective and practical means of dealing with contagious dysentery will be the greatest benefactor of the races that live in the tropics." Indeed we have much to learn regarding the causation, pathology and treatment of dysentery, and the consideration that the term probably covers a number of conditions differing from each other in all three respects adds difficulty and importance to the task. The address touches upon many other subjects—malaria and the mosquito, Texas fever, elephant-

tiasis, phthisis, diphtheria, cancer, tetanus, ankylostomiasis, rabies, jigger disease and leprosy, and always instructively and practically. It is most suggestive throughout and will amply repay thoughtful perusal.

THE PLAGUE.

It looks as if the Glasgow outbreak were extinguished. No new case has been discovered for a fortnight, and most of the contacts and suspects have been set free. On the other hand, a fatal case has occurred in South Wales near Cardiff. The disease in this instance seems to have been acquired on a steamer homeward bound from Buenos Ayres on which several suspicious seizures had occurred on the voyage. The outbreak of plague which originally commenced in Southern China in 1894 has now gained a wide diffusion, and incidents such as those that have happened at Glasgow and Cardiff have put sanitary authorities and executive officers on the *qui vive* to guard against a very possible importation and spread of the disease. The Local Government Board has circulated a brief description of plague to facilitate identification of cases, and issued instructions regarding measures which should be adopted for its detection and arrest. There is every reason to believe that port authorities are fully alive to the requirements of the position and prepared as in Glasgow to initiate and carry out thorough arrangements for exclusion and suppression.

THE HUXLEY LECTURE.

Lord Lister recently delivered at the Charing Cross Medical School the lecture which was established in memory of Huxley. This is the third of the series, the two previous lectures having been given by Professors Michael Foster and Rudolf Virchow. Lister was asked to give some account of his own work in physiology and pathology, and he has done so in a very able and attractive manner. The lecture may be described as a fragment of scientific autobiography and reveals an inquiring mind, scientific ardour and industry, keen power of operation, rare ingenuity in devising and skill in executing experiments, exquisite insight in interpreting results, and a fine modesty which exalts the work and conceals the worker. The exigencies of time caused the later part of the lecture to be sketchy and left no room for a whole series of experiments regarding fermentation and

putrefaction which preceded and accompanied the introductions of the antiseptic system into surgery. It is to be hoped that this lecture will be the nucleus of a detailed account of the whole of Lord Lister's scientific labours.

12th October, 1900.

K. McL.

Current Topics.

LORD CURZON ON THE FAMINE MORTALITY.

IN the very interesting speech in which H. E. the Viceroy reviewed the fight against the famine, now happily almost at an end, there occur several passages of medical interest. The unprecedentedly wide area affected, as well as the success in combating it, will always make the famine of 1899 a landmark in Indian History. We may quote Lord Curzon's words—

"It affected, and may almost be said to have annihilated, the working capital of the agricultural classes. It struck some of them when they were still down from the effects of the recent shock. It struck others, who had never before known what calamity was, and who were crushed and shattered by the suddenness and directness of the blow. It attacked Native States to whose Durbars had never previously been brought home the obligation of famine relief on an extended scale, and whose dearth of administrative staff was enhanced by the poverty of their financial resources. It laid its hand upon primitive hill men, unused to discipline or restraint, impulsive, improvident, lazy, living in an almost barbarous state in wild and inaccessible jungles. It sharpened the lurking nomadic instinct of wandering tribes, and sent them aimlessly drifting about the country, a terror to the famine officer, and an incubus to the camps. For a year it never left hold of its victims; and one half of the year had not elapsed before famine had brought its familiar attendant furies in its train; and cholera, dysentery and fever had fallen upon an already exhausted and enfeebled population. This is the picture of suffering that India has presented during the past year."

To meet this the Government of India deputed no less than 637 men from civil and military employ, among whom were 35 Assistant-Surgeons, 141 Hospital Assistants. When a great outbreak of cholera disorganised the relief works in Guzerat and drove the terrified workers away to their homes and spread still further the disease, the Government opened petty village relief works to take the place of the deserted P. W. D. relief camps, and the Viceroy has reason to believe that this wise policy led to a satisfactory decline in the death-rate. The Sanitary Commissioner of Bombay attributed the great mortality in Guzerat to the following causes:—Insufficient and unwholesome food, resort to Rangoon rice and other unaccustomed grains, bad cooking, bad water, and the physical softness of the people. The death-rate in Guzerat in April was 3.25 per mille, and rose in August to 15 per mille (per month) in one district. This rise being due to the sudden

change in the climatic conditions due to the rains. Lord Curzon calculates that the famine of 1899-90 has cost the parts of India affected 750,000 lives, *i. e.*, that in the excess mortality. Out of this total, cholera and smallpox are recorded with 230,000 deaths, and this figure is probably below the mark. This leaves about half a million deaths due to famine conditions, but all these by no means died of starvation or even destitution. After all, these figures, great and terrible as they seem, amount only to 2 per cent. of the population affected, so that it is abundantly clear that a famine combatted by modern methods and under an enlightened Government is by no means the check upon population which the experience of famine in olden days led Malthus to formulate his natural checks upon population. The contrast between this famine and those of a hundred years ago is most marked, and is an effectual reply to those agitators who pretend to look upon the days in India before the British raj as a sort of Saturnian Age.

DYSENTERY AND RHEUMATISM.

It must have struck those who have read French works on dysentery how that a considerable space is devoted to the discussion of what French writers call "Infectious dysenteric pseudo-rheumatism." This is the more remarkable in that as far as we can find out, but little attention has been paid to this phenomenon in dysentery by English writers on diseases of the tropics. Take for example two of the most recent articles on dysentery, the chapter on dysentery in Manson's book, and that by Mr. Cantlie in the first volume of Dr. Allchin's "Manual of Medicine;" in neither of these admirable accounts of dysentery is the subject as much as even mentioned, whereas in the recent volume by M. Brault no less than ten pages is devoted to the subject. Such an omission on the part of these English writers can only mean that they have either not met the complication, or only regarded it as a coincidence. Nevertheless it was Sydenham, the father of English medicine, who was the first to note the connection, and within the past century numerous outbreaks have been described in which the rheumatism has been a marked complication. It may be noted, however, that all the outbreaks in which this complication has been recorded have been in non-tropical countries, although M. Brault has noted cases in Algiers. In our own experience of dysentery we have never seen the complication but once, and that recently, in a case where on the third day the bowel symptoms suddenly ceased, and at the same time a sudden and marked arthritis of both knee-joints was observed.

This arthritis or rheumatism in the majority of cases is a post-dysenteric phenomenon, but in some instances it may occur in the midst of a

dysenteric case, and the arthritis may take, as it were, the place of the bowel-complaint. Any joint may be affected, though the knees appear to suffer most frequently. The pain is described as usually moderate, effusion is present, but rarely excessive. Cardiac complications, as in acute rheumatism, have been noted, but M. Brault seems to doubt the accuracy of these observations. The prognosis is usually good, both for the rheumatism and for dysentery, and the use of the joints is usually completely recovered.

The arthritis is said by modern writers to be due to an absorption of toxins, and in a way is analogous to the arthritis which is often a serious complication of gonorrhœa.

In the various forms of dysentery common in India this complication must be considered rare, otherwise it is impossible to explain the silence of English writers on the subject, it is probable that it is rather a complication of the form or forms of dysentery common in temperate climates.

THE BURMA HOSPITALS ANNUAL REPORT.

THIS report written for the first time by an Inspector-General of Civil Hospitals in Burma, is a very interesting document. There are now 110 hospitals of all classes open in the Province, five more than in the previous year. In spite of the year 1899 being generally a healthy one in Burma, the attendance of patients has increased, and there is every sign that the Burman is becoming more and more inclined to resort to European Hospitals. An interesting portion of Colonel Little's report is given to the question of beri-beri. Captain Barry's inquiry into the prevalence of this disease in Rangoon has already been published in these columns in September last. We observe, however, in this report that this disease is one which sometimes attacks men who live in the lighthouses and lightships on the coast of Burma. Owing, however, to the wise precautions taken, chiefly in the way of frequent reliefs, medical selection and a supply of good provisions, these cases have become few in number, they are, however, well worth careful observation, as outbreaks in small communities like those on lighthouses as on ships, might well afford further glimpses into the etiology of a sufficiently obscure disease.

During the early months of the year Rangoon suffered from a severe outbreak of smallpox, and 1,053 cases were admitted to the General Hospital. It is noted that hæmorrhagic cases were common and usually fatal, and confluent cases were very numerous and almost entirely among the unvaccinated. It is remarkable that the Hindu population of Rangoon suffered far more than the Burmans themselves.

Turning to the surgical side of the Report we note at once that neither cataract nor stone is anything like so common in Burmah as shown by hospital attendances as in other parts of India.

In all the hospitals only 28 cases were operated upon for cataract, while in the year only 29 operations were done for stone in the bladder, though we notice that there were also 21 operations for removal of urethral calculi, &c. We have several times noticed that in places where stone in the bladder is not common, it is not rare to find a considerable number of urethral calculi, as if the disordered chemistry could not produce a stone big enough to be stopped by the beginning of the urethra. Colonel Little, however, is not satisfied that the attendance at the hospitals at all accurately represents the real amount of surgical disease in the country. When he inspected Prome, Colonel Little found a cabinet full of stones, which had been operated on by Dr. C. G. R. Naylor, now retired. Again Captain Rost, I.M.S., who has recently joined the Civil Medical Department, also was able to find a lot of cataract cases in the villages which he visited for vaccination inspections. It is probable, therefore, that before long we may find Burma taking a much higher place in the list of operations for India. As it is Captain Barry, I.M.S., and Captain C. Duer, I.M.S., easily head the list of operators, both these officers being attached to the General Hospital, Rangoon. An interesting note is published in the Appendix in which Captain Duer traces the rise of a department for diseases of woman in connection with the General Hospital, and points out the very reasonable wants of this department, more especially in the way of assuring privacy for females; till this is done there cannot be expected to be a flourishing department of woman's diseases. As it is we are glad to notice that that Lieutenant-Colonel Thomas, I.M.S., the Civil Surgeon, is able to report on the successful performance of five ovariectomies, "*the first and only successful cases of ovariectomy performed in Burma*;" one of them was done by Captain Barry, who also removed successfully a tubal pregnancy. We hope this is only the beginning, and that in future years we shall be able to chronicle a further and marked increase in the operations done in the hospitals of Burma. In another column we publish a valuable note on the causes of beri-beri in Burma by Captain E. R. Rost, I.M.S.

TIGHT MILITARY UNIFORMS.

In the course of an excellent article on the "Breed of Man" in the October number of the *Nineteenth Century*, Dr. Hely Hutchinson Almond, the Head-Master of the well-known public school at Loretto, has some admirable remarks on the absurdity and worst of the tight-buttoned and belted uniforms of soldiers. In the course of some remarks on the training at Sandhurst, he writes: "It is unfortunately marred by evil traditions about what is military in the way of clothing. For it is as certain as any

proposition in Euclid, and that the breathing organs and all the limbs should have absolutely free play. It is known as a fact that if a number of soldiers and sailors take a long march on a hot day, many of the former will fall out and not one of the latter." Dr. Almond goes on to show what not even the *Lancet* nor *British Medical Journal* recognised, though they wrote learnedly on the subject, and that is that it was not the heat of the sun at the recent disastrous manœuvres at Aldershot, but the tightly buttoned coats of hot material which knocked up the men. One Royal Reserve Regiment, which had as a Commanding Officer a sensible man, did all the drills in their shirt sleeves, and not a man suffered from the sun. No wonder Dr. Almond writes, "it is pitiable to read of this astounding ignorance and indifference at the close of a century which prides itself on being civilised and scientific. Do none of these military men know, that in order to lessen suffering from heat the nape of the neck should be kept cool? One might expect such ignorance from the young fools who punt, row or cycle in high collars, but not from those who have the responsibility of keeping Her Majesty's forces in the best possible condition." Dr. Almond probably correctly traces these strange ideas on the part of Regimental Officers to their training in Sandhurst, where they are taught these absurd notions about military smartness, as if smartness was only compatible with stiff collars and tightly buttoned tunics. Is the cricketer not smart, is the sailor not disciplined? yet neither of them wear stiff collars and tight coats. Would any officer in his senses go out for a morning's snipe shooting in the tight-buttoned and belted clothes in which he goes out to fight? How much of our ill success in catching the elusive De Wet is due to the fatigue produced in our men by their uniforms?

THE VALUE OF PERMANGANATE OF POTASH IN CHOLERA OUTBREAKS.

THE following extract from the report of the Superintending Engineer, Allahabad Circle, is worth quoting, as it shows to what an extent the practice of disinfecting cholera-polluted wells was used in the recent famine in the North-West Provinces. It is taken from the Government Resolution on Famine Relief:—

"In the succeeding epidemic of May 1896 the permanganate was used somewhat perfunctorily and without any understanding of its importance, or much belief in its efficacy, on the part of the Officers-in-charge and the Visiting Inspectors: its use, however, extended. The disinfection of wells is strongly insisted on in the Public Works Department Rules issued in December 1896, and enforced general attention to the point. The first March epidemic in Allahabad was earlier than expected, and caught us in the midst of a struggle with other difficulties, and without a large enough supply of the drug at hand. A supply of

1,700lbs. of permanganate was at once ordered (ready made up in 5lb. boxes of two-ounce packets) and obtained with difficulty: meanwhile, the epidemic raged in just the same ungovernable way as last year. In April we got the drug well distributed at all points and the disinfection of wells going on everywhere, apparently contaminated or not. After this there was no more mere blind running away from cholera, but we were able to fight it, and we did so with early success in every case excepting the attack in Hamirpur. All officers on the relief works got to thoroughly believe in the efficacy of the drug, and much attention was given to its use. Many zemindars asked for packets of it for use in wells which were not near our works, and many others asked us to disinfect their wells for them. Under the name of *lal dawdi* this drug is now familiar in every hamlet of the Bundelkhand district, and is largely believed in. It has been often shown how impossible it is to ensure disinfection, very picturesquely shown by Professor Hankin in many cases; but there is no reasonable doubt that in permanganate of potassium we have a most valuable ally in combating these baneful choleraic epidemics. Altogether we used up about 1,950lbs. of the drug; and the small practical point of having it ready made up in two-ounce packets, packed 40 in a tin box, was found to be of the greatest assistance in facilitating its use. The simple directions now are, to go on putting in half a packet at a time till the water retains a faint pink colour for four hours; and to repeat the dose every week, preferably on a Sunday."

The Sanitary Commissioner, North-West Provinces and Oudh, notes also that the permanganate has proved a most useful agent in checking disease, and that its efficacy is now popularly recognised.

THE BENGAL VETERINARY COLLEGE.

THE annual report of the Civil Veterinary Department in Bengal always contains much that is of interest to medical men. We note in a letter from the Health Officer, Calcutta, that no less than 102 ponies and 29 cattle, belonging to the Calcutta Corporation, died of glanders and rinderpest respectively. In consequence Major Raymond, A.V.D., recommends that the mallein test be freely used to isolate the affected ponies, and that the Corporation should keep a veterinary staff for the purpose. It appears that the mallein is useful, much as is tuberculin, as a means of diagnosis rather than as a treatment. As regards rinderpest an interesting experiment is detailed. Mr. Keventer, of the Aligarh Dairy, asked for assistance, and 291 animals, mostly cows, were inoculated by the bile method. Major Raymond does not think that the treatment had much immunising effect, though Mr. Keventer appears to have been satisfied. The Imperial Bacteriologist has, however, now prepared anti-rinderpest serum of a standardised strength which, it may be hoped, will prove effective.

It is recorded that the trypanosoma of surra is not infrequently present in the blood of cattle in Bengal.

We are glad to learn that the dangerous prevalence of glanders in Calcutta is engaging the attention of the Government.

SO-CALLED COPPER POISONING.

IN India, where copper cooking vessels are so largely used, it is an article of faith among many that if these utensils are not properly "killed" at regular intervals, there is danger of copper poisoning. In a recent article, however, Dr. T. W. Hime, of Bradford, has denounced this as a fallacy as well as the well-known supposed danger of poisoning by "green peas." It has been established, says Dr. Hime, beyond question that copper may, after being swallowed, be absorbed into the blood and exist there for at least 20 years without the slightest interference with health. "Copper utensils are quite harmless with ordinary cleanliness. The alleged causes of copper poisoning by food cooked in copper vessels are usually cases of ptomain poisoning." There is, therefore, no ground, says Dr. Hime, for the prohibition of "coppered" vegetables; as a matter of fact innumerable kinds of fruit vegetables, cereals, &c., do contain naturally a small proportion of copper.

THE WATER OF THE GANGES.

THE reputation of the water of the Ganges among the Hindu millions of India is known to all, and most of us were content to believe that in a hot and thirsty land like Northern India such a magnificent river as the Ganges had many claims to be highly thought of, but it would appear as if modern science was coming to the aid of ancient tradition in maintaining a special blessedness of the water of the Ganges. Mr. E. H. Hankin, in the preface to the fifth edition of his excellent pamphlet on "The Cause and Prevention of Cholera," writes as follows:—"Since I originally wrote this pamphlet I have discovered that the water of the Ganges and Jumna rivers is hostile to the growth of the cholera microbe, not only owing to the absence of food materials, but also owing to the actual presence of an antiseptic that has the power of destroying this microbe. At present I can make no suggestion as to the origin of this mysterious antiseptic."

We understood that this bactericidal power was not confined to the Ganges, but was due to the fact that rivers so broad and shallow as the Ganges were specially exposed to the bactericidal influence of the intense sunlight.

THE EXTINCTION OF RABIES IN ENGLAND.

THE *Gazette of India* for October 13th, 1900, contained a Notification from the Home Government preventing the importation of dogs from any country into England unless a special license has been obtained from the Board of Agriculture, 4, Whitehall Place, London, S. W. This license is in two forms, one allowing the dog to land and be kept for a period of six months in a special isolation station as the Dog Sanitarium, Mitcham, Surrey. In other special cases such a dog may be permitted to live with its owner if

he is a householder, and provided that no other dogs live in the same house. This permission does not apply to hotels, lodging houses, &c.

Practically speaking, this notification leads to the prohibition of importing dogs into England, and the Board invite the cordial co-operation of all dog-owners. The reason for this order is that "the disease of rabies in dogs and hydrophobia in man has become practically extinct" in England, and this order is designed to keep the disease out. A similar order has been for years in force in Australia.

INDIGENOUS DRUGS.

AN innocent circular, issued some months ago by the Inspector-General of Civil Hospitals, Bengal, has been made the text for a lot of writing in the lay newspapers of Calcutta on the subject of indigenous drugs.

There is no doubt that a large number of drugs indigenous to India are excellent substitutes for the more familiar drugs recognised in the British Pharmacopœia; it appears that a number of medical men are refraining from the use of these cheap and useful substitutes till the Indigenous Drugs Committee have submitted their report, but there seems to be little reason to wait for this event; many of these drugs are well-known and should be used. It is only by their use at the hands of scientific medical men that we shall ever be able to arrive at any just conclusion as to their value, it is probable, however, that when the Indian and Colonial Addendum to the British Pharmacopœia is published it will give an impetus to the use of more of these indigenous drugs.

CARE OF SOLDIERS' FEET.

THE *Medical Review* for September has an interesting note on the use of formalin for keeping soldiers' feet in good condition, and in the treatment of hyperidrosis. Formalin is very slightly toxic, and being volatile it is said to penetrate the skin. Its value as a deodorant for smelling feet was established by Orth in 1896. A German Army Surgeon has recently published his results with formalin. He used solutions of various strengths; the best preparation is a concentrated solution of formalin in water. In marked hyperidrosis this concentrated solution is applied four times in one day to the feet, and the odour usually disappears after the third application, after such application a soldier is fit to take part in manœuvres for fourteen days, wearing the same woollen socks. If weaker solutions are used the formalin must be the more frequently applied, e.g., a 30 per cent. solution would require six or seven applications. A few drops of formalin solution sprinkled in the boots or the powder on the socks are also useful means of using the drug.

THE Editor of *La Tribune Médicale* has discovered that the outbreak of plague in Glasgow is a punishment to Great Britain for her "international egoism," in that England has refused to follow France and other countries in setting up an impossible and useless quarantine. The same journal announced 100 cases of plague, whereas it was 100 contacts who were isolated on the finding of the first few cases. Plague is a dangerous disease to prophesy about, but the measures taken at Glasgow deserve success even if they do not command it.

A GOOD deal of attention has of late been devoted to the use of geranium root in the treatment of dysentery, and several nurses in South African Hospitals have had much to say about it. One root, *monsonia ovata*, it is well-known has a great reputation in dysentery, and we have for several years past been in correspondence with its discoverer, Dr. Maberly, of Capetown, and tried it with success in a few cases. Unfortunately *monsonia ovata* is a very difficult plant to obtain in abundance, and since Dr. Maberly drew attention to its value in the *Lancet*, there have been numerous substitutes put forward, which are quite worthless.

WHILE these columns are in the press we have received information of important changes impending in the constitution of the Asiatic Society of Bengal. The Committee presided over by Colonel T. H. Hendley, C. I. E., I. M. S., has made proposals which, if carried, will have the effect of greatly extending the repute and usefulness of this ancient Society. They propose to change the name of the Society to "The Royal Society of India," and to elect a limited number of Fellows and Associates. We shall revert to this subject, but meantime call the attention of medical men to the proposed changes.

WE invite the attention of our readers to the publication, on very liberal terms, of the Standards' Library of Famous Literature. This magnificent set of volumes contains the cream of the literature of all countries, and contains numerous articles of great interest to medical men.

THE want of a link between the plague infected rat and the plague infected man is probably the reason why the theory of Simond's has taken such a firm hold on the public mind, especially in Australia. There can be no doubt that such a link would explain much, but unfortunately Simond's observations have not been confirmed and have in fact been pulverised by Nuttall.

The *Medical Press and Circular* suggests that the Army Medical Corps should be taught

sanitation. Shades of Parkes and DeChaumont! If *The Medical Press* had suggested how the requirements of sanitation can be made to fit in with what are called "military exigencies," its advice would have been more valuable.

PROFESSOR KOCH's articles on malaria are not being absorbed with the ease it was anticipated. Recently we noted that Laveran had made criticism of them, much on the same lines as we ventured to do ourselves, now J. H. F. Kohlbrugge, a teacher of tropical diseases at Utrecht, states as we did "that Koch's assertions in regard to immunity against malaria, contradict the experience of all practitioners in tropical countries."

DR. NUTTALL, of Cambridge, we understand, has sent the Editor of the *Deutsche Medical Wochenschrift* a criticism of Koch's work, which has been refused publication "in Professor Koch's absence."

Professor Koch seems to be regarded in Germany as a sort of medical Kaiser, whom to criticise is *lèse majesté*.

OUR London Letter comments upon the admirable address of Sir W. MacGregor, M.D., K.C.M.G., at the opening of the London Tropical School of Medicine. It was one of the most interesting addresses on Tropical Medicine that we have ever read.

THE latest revision of the Bengal Plague Regulations appeared in the *Calcutta Gazette* for October 17th.

A MUCH advertised remedy, *Cuticura*, turns out on analysis to be nothing but vaseline and carbolic acid (two per cent.) with scents and perfume.

THE latest treatment for empyema is to make the patient lie in a hammock. The patient lies on his wounded side, which is thus perpetually drained. *Polyclinic*, October, p. 223.

A NEW medical word is explained in the *Polyclinic*, viz., "biopsy." A witty Frenchman defined it as "an autopsy on a living subject." It is used to mean a visual examination, like an abdominal exploration operation.

DR. R. W. FELKIN writes to *The Polyclinic* to say that negroes certainly do suffer from mosquito bites, and that a short residence in Europe seems to deprive them of their immunity to malaria. He says that Arabs cover over their heads while asleep to keep out the "bad air" (malaria),

so does every native of India, and it is just as likely that they also cover themselves thus to keep off mosquito bites. This custom should be often provocative of phthisis, at least it militates against the carrying out of the fresh air treatment.

THOUGH, according to Mr. J. Hutchinson, leprosy was introduced into Natal over sixty years ago, it has spread very sparingly, only a few hundred lepers exist in the Colony. This does not look as if it was either a contagious or a hereditary disease.

UP to the 1st October the year's war in South Africa had resulted in the following casualties:—Deaths in South Africa, 9,531; missing, 812; invalided home and died at home, 193; invalided home, unfit for further service, 873. Add to this 30,300 invalided home, and we have a total of 40,643 men and 1,862 officers sick, dead or wounded in this war.

IN the course of an article on the nature of cancer, Dr. J. Collins Warren, of Boston, U. S. A., states that cancer is rare in India "except in the Western and Southern portions of that country." Is there any evidence to show that cancer is more common in Bombay and Madras Presidencies than it is in Northern India? He refers to the statement of the supposed antagonism between malaria and cancer, but points out that both malaria and cancer are common in Holland. Is there any ground for such a statement? Phthisis and malaria were once thought to be antagonistic.

A DR. B. B. DAVIS, of Omaha, though he admits that "theoretically Bigelow's is the only operation for stone," goes on to say that "Indian Surgeons use the Bigelow method for soft stones and perineal or suprapubic cystotomy for hard stones." Dr. Davis advocates a suprapubic operation with a perineal hole for drainage. It is a pity he has not read our Stone Number. Similar statements occur in an article by Dr. Paschal in the *Texas Medical Journal*. He thinks perineal lithotripsy is not a "well accepted operation."

OUR admirable contemporary, *The Practitioner*, is nothing if not enterprising, and has quickly seized the opportunity of the Glasgow outbreak to bring out a "Special Plague Number." The articles are all good, being by Mr. Cantlie, Dr. Manson and others. We wonder how long it is since any of the writers has seen a case of plague except occasional ones in the seaport of London.

Of course such articles will contain little that is new to readers in India, but to judge by

the queries in the Home Medical papers a large number of practitioners at home are only now beginning to study the symptoms of plague. For such a collection of papers like those in the *Practitioner's* "Special Plague Number," will be very useful.

SAYS the *Practitioner*:—"If a civilian doctor says he found a bug in a splint, the flesh of the British public is made to creep by posters announcing 'more Hospital Horrors'"—Good.

"You can't expect to have Guy's on the Veldt" was the terse summing up of one witness at the Hospitals Commission Inquiry.

SINCE writing the note on the Liver Treatment of Night Blindness, we have tried with equal success cod-liver oil in 1-oz doses daily, and can strongly recommend this simple remedy.

A FULL and accurate *résumé* of our Stone Number is given in the *Edinburgh Medical Journal* for November.

MR. HAFFKINE is bringing out a book on plague, written in conjunction with Dr. Klein, F.R.S. The publisher is Mr. E. Arnold.

A COMPLETE index and tables of contents for the year are published with this number, as was done last December.

THIS, the last number of the century, completes the XXXVth Volume of the *Indian Medical Gazette*. We hope to have several articles for the first number of the Twentieth Century dealing with medical progress in India and Medical Service matters during the past 100 years.

WANTED OBSERVATIONS.

THE paper which we publish from the pen of Lieutenant-Colonel Giles, I.M.S., in this issue is one of much interest in view of the present attention which is being directed to the mosquito theory of malaria. Many of our readers, no doubt, will have read a correspondence which has been going on in the *Pioneer*, during November, on this question. The one fact which is clear in that we know far too little at present of the distribution and seasonal prevalence of mosquitoes to be able to dogmatise on the matter; most of us who have paid any attention to these insects will at least not agree with the statement of the writer of the *Pioneer* paragraphs that mosquitoes are absent in the rains and plentiful in the cold weather, such a statement is opposed to our experience in

Northern India. What is wanted is for medical men to note the presence and absence of these insects throughout the year, and especially the presence of the anopheles. In our experience mosquitoes are present (in South Bihar at least) all the year round except in December and January, which are too cold for them. In the rains they are certainly present, but while the punkas are going one is less troubled with them. The worst time seems to be the early spring, before the punkas begin, and the week or so after the punkas have stopped and before the real cold weather has set in. We mean these are the times when they trouble one most; they are, however, present at least nine months of the year.

As India is such a big place and has as many climates as Europe, the experience of one place is not that of another, hence we ask our readers to send us a short note, even on a postcard, stating in what months mosquitoes are most prevalent and when they are absent. If we had a sufficient amount of information of this kind, then it would be possible to assert something positively as to the connection between fever and mosquito prevalence in India.

The mosquito theory has an enormous amount of evidence in support of it, and it is our bounden duty in India to thrash the matter out. We must ask our readers not to be led away by statements, such as some in the *Pioneer* recently, which show something of an anti-scientific bias; if there is no such bias, we cannot understand the publication of a couple of columns of utter twaddle on the subject of "vital air," which recently occupied that amount of space in the leading newspaper of India. What are wanted are observations, and we shall be glad to publish all such sent us by our readers.

Reviews.

The Permanganate Treatment of Opium and Morphine Poisoning.—By DR. W. O. MOOR of New York City, U. S. A. London: MESSRS. BALLIERE, TINDALL & COX. 1s. 6d., pp. 69, 1899.

THE author of this small brochure introduced the permanganate treatment of opium poisoning in 1893 and still advocates the use of permanganate of potassium as "the antidote *par excellence* to opium and its alkaloids." If he means a chemical antidote acting when in contact with opium or morphia everyone will, we suppose, agree with him, but if he means a physiological antidote, which he does apparently, the evidence of such action is scanty and not proved by anything now brought forward. Dr. Moor gives one grain of permanganate by the mouth for each grain of morphia taken, or for each ten grains of opium, or for each drachm of lauda-

num. If the dose taken is not known he gives 8 or 10 grs. of the salt in a glass of water repeating it once or twice at half hour intervals. A weaker solution (gr. i to o. ss) is given every half hour until recovery. One grain in a teaspoonful of water is also injected hypodermically every half hour and the site of injection massaged. No mention is made of the much more important continuous washing out of the stomach with permanganate solution continued as long as the solution returns discoloured, or of artificial respiration. The pamphlet is principally made up of cases reported from various parts of the world—all attributing the recoveries to the use of permanganate. The bias of the author is shown by the fact that, though some cases favourable to the method are related as reported by Dr. A. P. Luff in the *British Medical Journal* of May 16th, 1896, other cases published on the same page by Surgn.-Capt. F. P. Maynard, I.M.S., who tried the treatment fairly extensively at the Calcutta Medical College Hospital and pointed out its defects and limitations, are not referred to at all.

Current Literature.

SPECIAL SENSES.

Friedenwald, of Baltimore, after trying atropin, bichloride of mercury, formaldehyde, ointments of iodoform, iodol, aristol, &c., in cases of **dentritic keratitis and marginal ulcer**, and finding them all unsatisfactory, has employed tincture of iodine in his last 25 cases with good results. A bit of absorbent cotton is wrapped tightly about a fine wood toothpick so as to form a narrow firm swab; this is dipped in tincture of iodine, and the excess allowed to drop off. The eye having been prepared by instilling cocain and a drop of fluorescein, the ulcerated area is scrubbed thoroughly until a distinct brown discoloration is seen. The neighbouring epithelium is very much loosened and curls up in all directions. It is important to touch this and especially the minute infiltrations seen a millimeter or two away from the main line of ulceration; for the progress of the disease is usually this that after those fine infiltrations are observed the furrowed ulceration soon makes its appearance. No ill-effects were seen from applying the iodine too freely. Being too cautious is a more probable error. Applied freely a second application is rarely needed. The eye is bandaged and boric ointment or iodol applied for a few days. Friedenwald says he was able to associate one case with malaria. Iodine cured it rapidly, though the malaria remained. Marginal crescentic ulcers benefited by iodine treatment also.—(*American Journal of Ophthalmology*, July 1900.)

In Vol. II (Ninth Series) of *International Clinics*, 1900, appears a clinical lecture delivered by Professor Fränkel of Berlin. He first showed a child seven years of age who had two years previously had a number of **papillary tumours** springing from the mucous membrane of the vocal cords. Under tonics fresh air and nutritious food the growths absolutely disappeared in three months. After a year and a half's freedom the papillary tumours were again to be seen. The child had run down in health and Professor Fränkel proposed to remove them if further tonics, &c., effected no change.

The disappearance of the growth was due to a real reabsorption, gradual tissue retrogression (metamorphosis). They were not loosened by convulsive coughing movements and coughed up. Their reabsorption was observed day by day. The case is extremely interesting owing to the fact that the development of capillary tumours of the air passages in general seems dependent on a certain diathesis. They have a modicum of malignancy about them, since even after thorough and it would seem radical removal by operation they have a tendency to local relapse. They grow always from the laryngeal mucous membrane, and never from that of the pharynx or nose, and the prognosis as to return is never absolute since local or at least regional relapse is very frequent.

A case of **influenzal laryngitis** was next shown. What are regarded as characteristic changes were found in the patient's vocal cords. The laryngeal mucous membrane was distinctly swollen and hyperæmic. The vocal cords were distinctly redder than normal, because of the inflammatory hyperæmia, and when the redness was most intense, there occurred whitish spots, which seemed however to be on the same level as the surrounding hyperæmic parts. These spots occurred especially to the front of the larynx, and went as far as the middle but not further back. This appearance furnishes a characteristic laryngoscopic picture of influenzal laryngitis, and makes the diagnosis certain. The white spots seem to be fibrinous infiltrations. They are rather chronic. They remain almost in their original condition for two or three weeks, and after the hyperæmia of the cord has disappeared, they are still plainly to be seen. After about fourteen days and with the disappearance of the cordal redness, there is noticed around each of the spots a reddish areola, more or less distinct. Then the mucosa ceases to reflect light as before. The whitish spots become of a dirtier darker shade, and careful laryngoscopic observation reveals slight differences of level, so that there is evidently loss of tissue, and manifestly this last stage is one of little ulcers. The spots take on a reddish colour that forms as great a contrast with the now white normal vocal cords as the original white spots did with the hyperæmic red cords. It is six to eight weeks before the normal appearance is restored. In the case shown the hoarseness was not always of the same intensity. At times the patient could speak scarcely above a whisper; at others he used a very high pitch instead of his ordinary voice. The dysphonia came on rather suddenly after an apparently mild attack of influenza. Treatment was unsatisfactory, and rest and good nutrition proved of most use.

F. P. MAYNARD.

MEDICINE.

Rheumatoid Arthritis.—(*The Practitioner*, May 1900). The Editor has made an excellent choice of a disease that gives the medical practitioner much trouble in its successful treatment. Dr. Arthur P. Luff gives the differential diagnosis of rheumatoid arthritis, gout and rheumatism. He considers that many cases of so-called chronic rheumatism are really something else, some belong to the category of rheumatoid arthritis, others are gout, whereas chronic rheumatism of the joints is, in his opinion, a comparatively rare affection. He does not favour the view of its nervous origin, on the contrary he believes in a microbic and infective etiology. Micro-organisms settle in the affected joints and these produce a toxine, which enters the circulation and causes the nervous symptoms associated with the disease.

Mr. Arbuthnot Lane uses the term mechanical or traumatic arthritis to cover the pathological changes usually classed as osteo-arthritis or rheumatoid arthritis. He believes that anatomists, physiologists and

surgeons have not paid sufficient attention to pressure changes in the joints, to the subtle and long continued effects of attitudes and occupations, to the variations in health and disease. He lays down the three following propositions :—

(1) The skeleton remains normal only so long as it performs a certain combination of *movements of activity* and assumes *attitudes of rest*, i.e., the individual bears a definite mechanical relationship to his surroundings. This relationship varies in different races, hence the average individual of each race has a normal anatomy of his own.

(2) Feeble children imperfectly perform their physiological functions. Their habitual attitudes of rest vary as their imperfect respiratory functions. These attitudes become fixed in time according as the rate of bone formation varies inversely with the pressure transmitted. Consequently a change results in the relationship of the epiphysis to the body of the bone, an alteration in the form of contiguous ends of bones along with an increased area of articular surfaces by the formation of bone upon their edges. In movable joints this marginal osseous formation becomes covered by articular cartilage. After the meridian of life the opposing surfaces of articular cartilage are removed at the points of greatest stress, and the exposed layer of bone is rendered dense and eburnated. Associated with this there is a progressive destruction of the opposing bony surfaces, with the formation of additional bone on their articular margins, in order to render the joint more secure. The new bone is not covered by articular cartilage at this period.

D. M. MOIR.

ANNUAL REPORTS.

THE ANNUAL VACCINATION REPORTS.

THE annual note on vaccination in Bengal for the year 1900 is a colourless document, but is nevertheless a record of a considerable amount of good work. The Vaccination Department throughout most of the year was without the services of the Deputy Sanitary Commissioners, who, when they existed at all, were chiefly employed on important plague duties.

There was an increase in the total numbers vaccinated, the total now being 2,252,521, but when we consider the protection afforded to infants it only amounts 20 per cent. or $\frac{1}{5}$, so that there is ample room for improvements. Nor is it even satisfactory in Municipal towns where the average is 40 per cent. of infant protection, and in some towns it is disgracefully low. The six puncture system is now generally in force in the province, but we have never seen any reason for increasing the number of points above four.

The percentage of success is very high, 97 per cent.—a marvellous figure for vaccination done by men of the ordinary vaccinator class. The proportion of successfully vaccinated per 1,000 of population varies enormously from over 50 per cent. to 1·8. The protection afforded to infants also varies much, and in most of the mufassal municipalities is very small, this too in spite of a so-called Compulsory Vaccination Act. The cost of each successful case of vaccination works out at 1 anna four pies.

A table on page 16 of the report illustrates the death-rate from small-pox and the degree of protection afforded during the past seven years. A few words of comment upon this diagram would have been an improvement. From statement No. 16 it appears that in the Darjeeling Depôt 411 calves produced 53,000 grains of lymph, i.e., about 140 grains per calf of lanolin lymph, this seems a small amount if it is compared with the results of the glycerinated lymph prepared in Europe. Thus at Dresden Dr. Chalybaeus calculated that one calf can produce from 50 to 75 grammes of glycerinated emulsion, i.e., 750 to 1,125 grains of lymph. The attempts to make glycerinated lymph at the Darjeeling Depôt have by no means been a success, considering the small establishment employed,—this is however not wonderful. No less than 250,000 vaccinations were however performed in Bengal direct from the calf. We are glad to see an improvement in the number of inspections made by Civil Surgeons, in five districts the numbers inspected were over ten thousand each.

We have personally inspected about 1,200 vaccinations done last year with lanolin lymph prepared at Darjeeling, and can testify to its general excellence. Our attempts with glycerin lymph prepared at same depôt have, however, been invariably unsuccessful.

THE MADRAS VACCINATION REPORT.

THE report on vaccination for the year ending 31st March 1900, for the Madras Presidency, is submitted by Capt. W. C. Vickers, M.B., I.M.S., the Deputy Sanitary Commissioner. The Mysore Vaccine Institute, which has a deserved reputation, is no longer able to supply lanolin paste, therefore arrangements were being made to start at Central Vaccine Institute for Madras. In Madras also an increase in the total vaccinations is reported, but there is a heavy decrease in the revaccinations which is unsatisfactory. The ratio per cent. of successful cases is 91 in Madras, a figure nearer the truth than the higher figures given in other provinces. It is remarkable too that the percentage success of cases done in dispensaries or by medical subordinates is lower than those done by the rural vaccinators, and tends to show that the real percentage of success is not so high as returns would lead one to believe. Madras city like Calcutta appears to be backward in vaccination. Thirty per cent. of the registered births of the year were vaccinated, as compared with 20 per cent. in Bengal, the birth-rate in Bengal, however, is taken at 50 per cent., and only at 30 per cent. in Madras.

Lanolin paste from Mysore (strength 1 in 7) had a success of 91 to 95 per cent. in Madras. Glycerin lymph is used to a small extent "often being prepared by the vaccinators themselves," and is used more as a diluent than as a preservative. It appears that in the climate of Madras glycerin paste is "incapable of prolonged retention of activity," an important point which deserves further investigation.

In an interesting letter, forwarding the Report, Lieutenant-Colonel King, I.M.S., the Sanitary Commissioner, refers with satisfaction to the improvement in the class of men employed as Inspectors of Vaccination, this has been effected by enrolling certificated Sanitary Inspectors, who have been specially trained at the Mysore Institute.

THE N.-W. P. AND OUDH VACCINATION REPORT.

IN the North-West Provinces and Oudh the total number of Vaccinations performed was 1,511,436, an increase on the figures for the previous year. This is satisfactory as many of the vaccinators had to be deputed to plague duty. In Mirzapur the district authorities are credited with having discouraged vaccination by instructing the people that it was not compulsory. The statement relating to the protection afforded to infants is not very clear either in this or any of the Provincial Vaccination Reports. It is by no means certain that the proposal of the Army Sanitary Commission on this matter is quite what is wanted, certainly it is very difficult to get any satisfactory meaning out of the diagrams, and Sanitary Commissioners, in publishing the diagram, appear to have felt this.

THE PUNJAB VACCINATION REPORT.

THERE was a very substantial increase in primary vaccinations in the Punjab in the year 1899-90, and also in revaccination. This success is attributed to the more systematic way in which bodies of vaccinators are worked in the Punjab. The percentage of success returned by the Vaccination Special Staff is 82 per cent., a figure which contrasts with those of other provinces, but is probably nearly the correct average success for average work. A shaded map to face page 6 of the report gives the figures of small-pox mortality; it appears that Kangra and Simla districts show a complete immunity from mortality from smallpox, whereas the rate was high in Peshawar, Kohat and Gurgaon, where there is very strong opposition to vaccination. Captain Wilkinson, I.M.S., submitted an interesting report on the fœtation of vaccine scars from vaselin lymph. This pitted appearance is certainly characteristic of good vaccination, but its absence often only means that excessive scarring has been caused by the use of too much lymph or to the use of the vaccinating instrument with a too heavy hand, a common fault of Indian vaccinators. The experiments to prove the degree of protection afforded by vaselin lymph, given by Captain Wilkinson, are too few to enable one to form a correct judgment. They are however extremely interesting, and will, we hope, be repeated next year. In this Gazette in the year 1896 (March, p. 91) we published a list of 40 cases in which vaccination was successfully performed with a very short period (3 days in seven cases) of a previously "successful" operation, and Major D. M. Moir, I.M.S., drew attention (*J. M. G.*, July 1896, p. 241) to a large number of similar cases. It may be however that immunity from, or susceptibility to—vaccination is not quite the same thing as liability to smallpox. The statement to the degree of protection afforded to infants under one year is given without comment. It is desirable that the instructions as to this statement be republished, clearly stating not only what is wanted, but how the results and the calculations are to be arrived at.

THE ASSAM VACCINATION REPORT.

THE total number of vaccination done in the year 1899 was considerably in excess of the quinquennial average. The percentage success is given as 98 for primary and 88 for revaccinations, and Colonel Carr Calthrop, I.M.S., considers these figures as correct,

on account of the known high quality of Assam glycerin lymph; recently Captain Leventon, I.M.S., has done 272 cases himself with only two failures. We had an opportunity last year of trying this lymph, and testified to its very high excellence, it was certainly the best lymph we have ever used in India. The lymph, in fact, is so strong that orders were issued to use only two or three points in children—a circumstance which contrasts strongly with the 6 points ordered in Bengal. It is satisfactory to read of the phenomenal spread of vaccination in the Garo Hills, where only 5,000 were done in 1895, now the figure is 28,000. This reflects great credit on the Civil Surgeons of that district, and especially Assistant-Surgeon Bancroft, whose good work was brought to the attention of the Chief Commissioner. As in other provinces the complaint is made that it is in the municipalities where a Compulsory Act is in force that the work shows least progress; here as elsewhere it is among the educated classes that opposition is most met. Table V gives the number of children protected (of those under one year) as only 57 per cent. The Reports contains a very interesting report on the Vaccine Dépôt by Lieutenant-Colonel Neil Campbell, I.M.S., now Civil Surgeon of Purnea, to whom in past years so much of the success of this Assam Dépôt has been due. About 1,000 tubes can be obtained from one calf. We are glad to see that a new building for the Vaccine Dépôt has been opened. In the matter of preparing lymph no province in India surpasses Assam.

Correspondence.

A GARBLED QUOTATION.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—Dr. Lawrie confesses, in your issue for September, that he added the words "in malaria" to a quotation from me in which they did not occur. He explains that he thought that I was referring to the case of the microscope in malaria alone. As a matter of fact I was not; and I may point out that, whatever Dr. Lawrie thought I meant, it was not right of him to alter my statement by additions of his own.

He is quite welcome to consider that statement as being "extravagant and exaggerated." With his very peculiar views about "Laveran's bodies," this was only to be expected. But his private opinions on the point do not exonerate him, first from misquoting me, and, secondly, from not apologising when the error has been pointed out.

Your obedient Servant,

RONALD ROSS, D.P.H., M.R.C.S.

LIVERPOOL;
24th September 1900. }

HÆMOGLOBINURIC FEVER IN MALARIA.

TWO CASES CAUSED BY QUININE: ONE RECOVERY ON METHYLENE-BLUE.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—The following note may be suggestive, and perhaps of some help to some one. It makes no pretence at scientific completeness, but is a hint taken amidst a multiplicity of duties.

The family has no history of renal disease, except that one son, grown up now in America, is said to have had two attacks of malarial hæmoglobinuria while here as a child.

CASE I.—G. M., Loy, age 4, American. In August of 1899 is said to have had an attack of blackwater fever in Darjeeling, and another on returning here a few weeks later. Had no attacks of malaria through the year, and in general seemed very rugged and strong. On 22nd June was having rather a severe attack of malaria, relieved by a 5-gr. pill of quinine on two successive days, with no unpleasant effect. On the 29th fever came on again with chill and vomiting, all through complaining of distress in the region of the stomach. No quinine was at hand, so with some timidity 4 grs. quinine-sulph. was given in pill form at 1.30 P.M., when the temperature had nearly reached normal; 3.30 P.M. hard chill and bilious vomiting, and at 4 P.M. patient passed 3 oz. very dark red urine, rich in hæmoglobin, but no discoverable blood corpuscles; no test made for albumin. At 6.20 temperature had reached 106°·3, slowly going to 97° at 12.40 A.M. Patient was about and lively, though with sallow complexion; till 5th July temperature 106°·3; 6th, normal; 7th, 104°; 8th, 103°; 9th, 101° at 10.30 A.M. At 1.30 P.M. perspiration had begun, and 4 grs. quinine was given; at 2.30 P.M. hard chill, and at 3 P.M. temperature 105°·2 and about the same quantity of "blackwater" was passed, temperature fluctuating till 8 P.M. the next day, when unconsciousness and moderate spasms supervened and 6 oz. of the dark urine was drawn; the marked tendency to vomiting all through was controlled by small doses of ipecac; the pulse during most of the time through the last three days was between 130 and 140. Unconsciousness continued, and convulsions slightly increased till death at 9 A.M. of the 11th.

CASE II.—Sister of above, 5 years older, said to have had little hæmoglobinuria after quinine near the end of June. An attack of malaria was later cured by quinine in small doses;

14th September another attack came on, 2 grs. quinine was followed in three hours by 4 grs., the temperature reaching normal. Four hours later chill and vomiting; and temperature going to 102°·6 an hour and half later, when about 4 oz. urine was passed, containing much albumin and hæmoglobin. Six hours later there was still much hæmoglobin in the urine, but the temperature gradually went to normal, and the patient seemed well three weeks, and then had another attack of the tertian, gradually passing into daily intermittent, and on the fifth day was put on methylene-blue, 1 gr. five times a day, making an excellent recovery in three days, remaining well till now nearly three weeks later.

I merely wish to point out the temporary recovery on quinine of Case I with no hæmoglobinuria, the hæmoglobinuria following quinine; and then, after the kidneys seem to have become more irritable, the hæmoglobinuria after a small dose of quinine. In Case II, the probable light attack of hæmoglobinuria after quinine; the recovery without complication in the one case, and the complication the second time with quinine and the subsequent action of methylene-blue.

Yours, &c.,

SILCHAR.

Rev'd. G. G. CROSIER, B.S., M.D.

DISCUSSION ON OPERATIONS FOR STONE.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—It is astonishing to see, in the discussion on operations for stone in the bladder, at the last meeting of the British* Medical Association, so eminent an authority as Mr. Cadge, trotting out that long exploded fallacy of the greater tolerance of the oriental, in regard to major operations. Nay, so obliging, we are told, is the native of this country, so anxious to please, so desirous of putting no unnecessary difficulties in the way of the surgeon, that he actually secretes a softer stone than his British brother, and provides a more capacious urethra to facilitate its extraction. We are glad to see that Mr. Freyer,† who now has an unique experience of operating for stone, both in England and in India, promptly challenged all these statements. Practice makes perfect in India as well as in England, and it wants no additional explanations of softer stones, more tolerant bladders, and more accommodating urethras, to account for the marked success of Indian surgeon in the practice of litholapaxy.

Yours, &c.,

J. T. C.

A NOTE ON MR. MILTON'S PAPER ON STONE.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—I think Mr. Milton's paper an excellent one, and that he has justification for every point he takes up. He writes clearly and moderately, and his results give him a right to speak definitely.

There is no doubt, I think, that a much larger proportion of unusually large stones are met with in Egypt than in India, and I am of the opinion also that the urethral capacity of the patients must also be larger to enable stones of the size Mr. Milton has crushed and removed to be dealt with. I also incline to the opinion that neither in Egypt nor anywhere else could a single stone weighing 12 oz. or even 8 oz. be crushed by any lithotrite that I have ever seen or heard of by the urethral route, and when debris weighing these enormous amounts happens to have been removed, two or even three large stones existed in the bladder. I think in the old cutting days it was a common observation that many cases of multiple stone were encountered, but we hear less of these nowadays after litholapaxy; perhaps we all assume that the fragments belong to one and the same stone. It would only be reasonable that one or several new concretions would form and pass down from the kidneys in a prolonged case.

I also incline to the opinion that perhaps too large a proportion of the cases at Hyderabad were subjected to the modified operation, and Mr. Milton has here good grounds for criticism, but at the same time I would infinitely prefer to make a small incision in a child's perineum, than to bruise or dilate the urethra by forcing in a lithotrite that the urethra did not easily accommodate.

To come now to Mr. Milton's specimens, there is apparently a smaller proportion of uric acid and oxalic acid stones among those sent by Mr. Milton than in my collection of Indian stones of all sizes, but it must be remembered that the stones sent by him are all large stones and should only be compared with large stones. It is well known that a large proportion of very large stones are from old standing cases, and those accompanied by cystitis get phosphatic concretions on them. There is one stone, however (No. 7 in the collection), white and crystalline like marble, which is, I think, composed of sulphate of calcium, this specimen is very hard. Others containing a large proportion of this material, and also a few dark urate stones are also correctly described as hard. Out of several hundred specimens in the Delhi Civil Hospital I find only one like Mr. Milton's No. 7, and this has an oxalic nucleus the size of a pigeon's egg.

* British Medical Journal, October 6th, 1900.

† Ibid.

The views of some of those who spoke at the recent British Medical Association meeting offer far better material for criticism. No greater condemnation of the suprapubic operation could be found than the progress of the case related by Dr. Burton, a case which died with a suprapubic sinus four months after operation. This stone, though it was 10 oz. 5 drachms, could easily have been dealt with by perineal lithotomy. The giant lithotrite will easily crush a stone the size of a fetal head, and requires only an opening as big as the index finger.

Yours, &c.,

DELHI: J. A. CUNNINGHAM, M.D., M.Ch.,
November 1900. Major, I.M.S.

THE TREATMENT OF CHOLERA.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—I have read with great interest the leader in the *Statesman* of 24th October on Major Brown's article in your paper on the treatment of cholera, etc., by oil of eucalyptus. I am interested for two reasons: Firstly, because of the relief given in dealing with this dreaded disease; and secondly, because it has been confirmatory of a treatment conducted by Captain E. E. Waters, I.M.S., at the Military Hospital, Buxa Duars, and by myself in the tea gardens of the same neighbourhood.

History.—I came out in 1896 as medical officer for the Torsarkos Division of the Duars. On my arrival cholera was raging in several of the estates, and several hundreds of the coolies died, and many more fled in fear. On coming in contact with the disease for the first time, I was appalled with the terrible effects, and my thoughts were naturally led out to the bacillus which was the cause of all this mischief. This, I was sure, was of no avail in the present emergency, and I at once began to study the symptoms. I was almost from the first led to the use of turpentine-cammonia which I administered myself, going from garden to garden and from coolie lines to coolie lines, I met with almost immediate and continued success. After the cholera epidemics were over (save a few sporadic cases) I was often troubled with cases of dysentery and diarrhoea, generally with bloody stools, but my unfailing remedy was my turpentine-ammonia emulsion, so that what hitherto had proved such a menace to the labour forces of the several gardens, was robbed of its dread and power. But owing to the nature of our free labour in this part, there is not the same opportunity for careful statistical observation as on agreement gardens, as in Assam. Consequently my work lost much of its effect as far as tabulating results was concerned. I only heard from the Sirdars how the sick were doing.

Towards the end of 1896 I had the pleasure of meeting Dr. Waters at Alipur Duars, and as a contemporary of mine at the Edinburgh University, we had much in common to talk about, and especially our work at that time. About a month or six weeks before there had been a change of the Garrison at Buxa, and a very bad epidemic of hill dysentery had broken out, and his hospital was full. I went over to him my experiences in the tea estates and gave him my formula for treatment. A fortnight after I had a line from him that the mixture was proving a great success, a week later that his hospital was empty.

Some time after I paid a visit to Buxa, and Dr. Waters kindly showed me over the "logbook" for that period, and also gave me extracts from daybook of some of the cases which quite accorded with my experience, although I was not able to get such definite observations. Since then I have always kept in my stores the abovementioned drugs in case of further outbreaks, but happily I have had none, but in cases of dysentery and diarrhoea it is my one stand by.

I believe Captain Waters at the time communicated with the P. M. O. regarding it, and also communicated his facts to one of the medical papers, but I cannot say how far it has been pushed in the Indian Medical Service, but with the observations and treatment of Major Brown, which have been entirely in sympathy with my own, I trust there will be a more definite and general recognition of this form of treatment by the service doctors, which I am sure will lead to an increased mitigation of the diseases connected with the bowels, which have caused such havoc in the numbers that have died.

What of Enteric? is there not something here that may come as a boon to the many who are battling with it? and you will be doing good service, Sir, by impressing this new fact brought forward, upon the minds of the professional men, again and again. We are so often so slow in the up-take that it needs the "summation of stimuli" to work its effect.

I hope you will not think me lengthy in my letter. I have only given you the barest facts and outline of what has been an important and pleasurable part of my medical career.

I am, etc.,

ALFRED J. COPPLESTONE, M.B., C.M.,

Edinburgh.

MR. MILTON'S PAPER ON STONE.

To the Editor of "THE INDIAN MEDICAL GAZETTE."

SIR,—With reference to Mr. Milton's article appearing in the current issue which you so kindly forwarded me, together with the samples of Mr. Milton's stones, I have some remarks to make which I shall be obliged if you insert. With reference to Keith's operation, as it has been up to the present practically only performed at Hyderabad, Sindh, I am sure the Surgeons of Hyderabad experience will be able to give Mr. Milton any details he may require concerning the necessity for that operation. One thing they have established, viz. that it is a safer operation than lateral lithotomy. Mr. Milton is mistaken if he thinks that Keith's operation is performed to any extent in the Punjab. One of the objects of my article in your "stone number" was to advocate its adoption in stones too large or too hard for litholapaxy by the urethral route in preference to any operation in which the bladder is opened by the surgeon's knife, and in case the stone would turn out impossible for a No. 20 lithotrite, to adopt an operation practically the same as the perineal operation advocated by Mr. Milton himself.

Both Major Baker and I were evidently under the impression that the formation of the vesical calculus in Egypt had some connection with chyluria.* My inference was drawn from Mr. Milton's article in the *Lancet*, May 2nd, 1896, which runs as follows:—"My personal experience of stone in children has been but small. In Egypt the very great majority of stones occur in subjects over ten years of age; the tables given with this paper do not demonstrate this point, but on reference to my records I find that out of the 200 cases given in Table I, nine only were in children under ten, whereas Cheselden in 213 cases met with 105. In India, on the other hand, the proportion of children operated on is exceptionally large. The difference is due to the fact that stone in Egypt is principally caused by the alterations produced in the urinary system by the presence of bilharzia embryos, and that the bilharzia parasite, while very common in adult males, is rare in women and children." These are the only facts I had to go on. I think my inference was fairly rational. In Mr. Milton's article in your current issue he now says, "chyluria is rare in Egypt, and I have never met with a case suffering from stone."

Mr. Milton states that my opinion as regards hard stones "should be based on knowledge." There was very little of the "Ego" in my article in your "stone number." I did not give my personal experience *in extenso*, as it did not seem necessary in the article I was writing. However, I have had experience of about 400 stones ranging in weight from 22 ounces down, and in patients from 100 years to eleven months, so that I think few would consider me an absolute novice in the art. I have never operated on an Egyptian stone, nor am I aware that Mr. Milton has operated on many Indian stones, so our power of gauging the hardness of stones is relative, except in one way, viz., the capacity of a standard lithotrite to deal with a stone of a given weight. Given a liberal amount of experience in litholapaxy, such as many of us have in India; I regard the operation as purely mechanical as the art of shoeing a horse, and I cannot understand one operator having what other experienced operators would consider magic power with a lithotrite. Mr. Milton lays down weights in children and adults above which he considers stones large. Weights are only one element in this matter. Hardness must also be taken into consideration, and I think that a better standard for this class of stones would be stones impossible from hardness or size or both for litholapaxy by the urethral route, the urethra being normal and there being no contraindications in bladder conditions. When Mr. Milton's dried fragments reached me, fragments of the 12½, 14 and 16 ounce stones were invoiced as missing.† The specimens are interesting, and much resemble the stones I have personally come across as far as one can judge from dried fragments. However, I consider that dried fragments are a most erroneous guide to the actual hardness of the particular stone as it is found in the bladder. To illustrate this point. In this Province two stones were dealt with by perineal lithotomy with the same lithotrite, a No. 26 Weiss, the smaller one by a highly skilled operator not long ago, the other by myself quite recently. The two stones were of the same composition and structure, and closely resemble Mr. Milton's specimen No. 7. The smaller one was just under six ounces, the larger one was 22 ounces. In the case of the smaller one it took two strong men to exert their utmost power in screwing up the instrument, and when the stone was broken the instrument was strained in the shaft, which is No. 20 English scale. In the case of the large one the same instrument in my hands broke the stone with ease, and I am no more skilled in the use of the instrument than my brother officer. I defy any man to say from the dried fragments which was the hard and which the soft stone. Again, the dried fragments of stones of one district in this Province are just like

* Chyluria is not perhaps the best description of the urine in cases of bladder bilharzia disease. In his article, however, Captain Smith wrote "Chyluria or such urine," including therefore Bilharzia disease—Ed. J. M. G.

† Lost en route in post to India.—Ed., J. M. G.

the dried fragments of stones of another district, yet it is a well recognised fact that the stones of some districts are incomparably harder than the stones of others. From these facts I consider that the only way of gauging the relative hardness of stones other than soft phosphates, is by the capacity of a standard instrument to break them. If a standard instrument will break one stone of a given size and is not powerful enough to break another of the same size, it seems to me to follow that the latter is harder than the former. Mr. Milton's instrument, with which he crushed the 12½-ounce stone, "more than usually dense," referred to in my article, is No. 15½ in the angle and No. 14 in the stem, ¾" long in the jaw, with a 5" locking grip. Weiss' instruments, large and small, are made with a jaw about half the length of the locking grip. Thus Weiss' A. No. (No. 16) is just under an inch long in the jaw, and its maximum locking power is just under two inches. In this respect in practice I personally have found that they are made mechanically correct. Weiss' A. No. is actually longer in the jaw than Mr. Milton's under consideration, and I find that it and the smaller ones made on the same principle are not capable of grasping hard stones larger than those on which they will lock. Hard stones larger than those on which a Weiss' instrument will lock slip out of the instrument. These same instruments are capable of dealing with larger soft stones than they will grasp across the axis. They will cut into the side of a relatively soft stone and thus get a grip, and stones of medium or under medium hardness can be so dealt with by any one skilled in the use of the instrument. I have personally dealt with 7 oz. uric acid stone of just under medium hardness with a Weiss A. No. without difficulty. If the same stone had been hard, it would have been impossible to deal with it with that instrument. Mr. Milton's instrument with a 5-in. grip should be 2½-in. long in the jaw. Of course, stones are not spheres, but large sized ones approach to spheres, I personally do not understand how it is mechanically possible for Mr. Milton's instrument, ¾" long in the jaw, to catch what we in India call a hard stone of over 12 ounces. If it were what we in India call a soft stone, it is comprehensible.

We appear to not get as great a proportion of large stones in adults as Mr. Milton does in Egypt. Mr. Milton lays down weights over which he would consider stones in children large. If Mr. Milton had referred to the tables in my article relating to children, he would have seen that the standard I took excluded many cases which by his standard would be large, and yet there remains enough to show him that we have a liberal experience in dealing with large stones in children, and it is just as difficult to deal with a large stone in a child as it is to deal with a large one in an adult. Further, Mr. Milton's large stones were all operated on by himself, a skilled operator. The results in my tables do not pretend to show the results of the leading operators in this province, though they include their results. A large proportion of them were done by members of the Subordinate Medical Department and by officers in Military employ, whose experience was naturally limited. It would be as fair a comparison to compare the results of one of the leading Indian operators with the combined results of Mr. Milton and of the men in charge of the dispensaries all over Egypt, assuming that Egypt has a Civil Medical Department such as we have in India.

I am personally very interested in Mr. Milton's results in perineal lithotomy, and consider that if he and the others who advocate the operation as an alternative to suprapubic lithotomy for large stones are able to keep up to his splendid record in the operation, we shall be able to render the suprapubic operation a thing of the past. With regard to Mr. Milton's remarks concerning what he calls my "sweeping condemnation" of perineal lithotomy, I think he cannot have read my article with care. If he had, he would have seen that the very title of the article was a plea for this very operation, and that my second last paragraph placed it where I considered it should be. What I said only "required to be mentioned to be condemned," was performing perineal lithotomy as an operation of election in cases in which there was no contra indication to litholapaxy. This I see no reason to depart from. Perineal lithotomy as performed by Mr. Milton or by me is nothing less than a lateral lithotomy as performed for small and medium sized stones, to which is added much more instrumentation than is required in ordinary lateral lithotomy, and it thus certainly cannot claim a smaller death-rate than Cheselden's operation for small and medium sized stones. I think at the present time it does not require to be argued that such a lateral lithotomy is a more formidable operation than litholapaxy in skilled hands in cases in which the latter operation is not contraindicated. I do not know whether Mr. Harrison does or does not do perineal lithotomy as an operation of election. Mr. Dolbeau is of the past. Mr. Milton laid down in the *Lancet*, April 18th, 1896, that he then did perineal lithotomy as an operation of election in cases in which urethral litholapaxy was feasible as a demonstration for his students. He says as follows:—"Bigelow's operation was performed in fifteen of the thirty-five cases, and the more experience I have in this operation the more I am convinced that there are very few cases indeed which it cannot cope with. It is true that in the larger portion of the thirty-five cases I have performed the perineal operation I have done so for one very sufficient reason. The operations are done before students, and practically their only experience of stone

operations is what they see me do. They will be called upon to operate on large stone cases, and for them and for the great majority of practitioners the perineal operation is by far the better. I therefore take frequent opportunities of demonstrating it to them. In the hands of a surgeon constantly operating, however, Bigelow's operation is practically capable of removing any stone however big."

If I am right in considering that perineal lithotomy, as performed by Mr. Milton in cases in which litholapaxy is feasible, is a more formidable operation than litholapaxy as far as the patient is concerned, I think I am right in saying that such an operation is to be condemned, and that such demonstration should be done in the post-mortem room.

Thanking you for your courtesy.

Yours,

H. SMITH, M.D., CAPTAIN, I.M.S.,

Civil Surgeon.

JULLUNDUR :
1st November 1900. }

Service Notes.

WHILE we do not agree with all that is written in the Editorial in the *British Medical Journal* for September 22nd, the following is to be remembered:—

"This is the third time within five years that all leave has been stopped; and having regard to the frequent recurrence of such emergencies, and to the trying climatic conditions of service in India, the question whether the establishment of the Indian Medical Service ought not to be permanently augmented necessarily arises. It has frequently been discussed, and we have reason to believe that representations have been made to the Indian Government, not only unofficially but officially. The financial authorities are, of course, opposed to any augmentation, and are disposed to contend that the admitted pressure on the Service is of a temporary character and ought to be met by temporary expedients. But when pressure can be considered to cease to be temporary we do not know, for it has continued almost without intermission for five years. It has already contributed to diminish the popularity of the Service, and threatens ultimately to extinguish it altogether."

CAPTAIN G. G. GIFFORD, I.M.S., acts as Professor of Surgery, Madras Medical College, till the return of Lieutenant-Colonel J. Maitland, I.M.S., from sick leave. Major F. J. Crawford, I.M.S., is acting as Professor of Materia Medica, and Captain C. Donovan, I.M.S., M.D., as Professor of Hygiene in the same College.

CAPTAIN LEUMANN, I.M.S., who has been on plague duty in Natal, since before the war, has been invalided to England, and has arrived in London.

LIEUTENANT-COLONEL FRENCH-MULLEN, I.M.S., has returned to Rajshahye as Civil Surgeon from Patna.

WE congratulate Captain B. H. Deare, I.M.S., the Civil Surgeon of Midnapur, on the donation of Rs. 5,000 from the Raja of Moisdal, for the erection of an operating room in the Civil Hospital, Midnapur.

RECENT issues of the *British Medical Journal* have contained interesting letters signed I. M. S., on the question of the Professorships in the Indian Medical Colleges. He hits the right nail on the head when he points out the example of the R. A. M. C. Unless prizes such as the Professorships are held out to I. M. S. men does any one imagine the Service would continue to attract the men it does from the schools? It is these Professorships and the Civil Surgeoncies which make the I. M. S. attractive to the House Surgeons and other young qualified men who enter it. Take them away and we shall be reduced to the state of the R. A. M. C. It is not the military side of the I. M. S. which brings in the good men to the Service. Professor Ogston in his much criticised address last year saw this clearly. The statements made about the withdrawal of Professors to military duties are simply deliberate misstatements. Such officers are especially exempt from such transfers.

If the War Office are only able to offer "the pay of a civilian on contract rates" to retired Indian Medical Officers who may wish to act for R. A. M. C. men absent on War Service, they will not attract many candidates.

CORRESPONDENTS in the *British Medical Journal* seem to write as if the way to reform the R. A. M. C. was to offer better pay, especially in the junior ranks. This is certainly necessary and just, but this will not improve the corps. What is wanted is a means of abolishing the present system whereby a junior officer has no incentive to be a good professional man; nor under the system of graded responsibility, (with a "senior man to revise your prescriptions" as we heard it once put,) is it likely that a man however keen at the beginning will ever be able to keep it up.

We are glad to learn that Captain G. Lamb, of the Research Laboratory, Bombay, has recovered from his attack of snake-poisoning. It appears that he was experimenting with a cobra, which bit him on the thumb; fortunately Calmette's serum was at hand, nevertheless he suffered severely from the symptoms of snake-poisoning. He has now recovered, but the top of the thumb has sloughed off, such was the intensity of the snake-poison.

We have been asked to publish the following note, drawn up by Major Andrew Buchanan, I.M.S., of the Nagpur Central Jail:—

"The following list shows the number of 1st and 2nd class Jails in the various Provinces, and the number of these which are reserved for I. M. S. men. (See No. 5964, from the Director-General, I. M. S., to the Chief Commissioner, Central Provinces, dated Simla, the 2nd December 1896):—

[NOTE.—Possibly some alterations may have been made since 1896.]

	Total.		Reserved for Indian Medical Service.	
	1st.	2nd.	1st.	2nd.
Madras	4	3	4	0
Bombay	1	2	1	1
Bengal	6	2	6	2
North-West Provinces ..	6	0	6	0
Punjab	4	0	4	0
Central Provinces ..	2	1	1	1
Burma	2	5	2	0
Hyderabad	1	1	0	0
	26	14	24	4

There are thus 24 appointments as Superintendent in 1st class Jails and 4 appointments in 2nd class Jails reserved for men of the Indian Medical Service.

2. The office of Inspector-General is held by an I. M. S. man in 5 Provinces, viz., Punjab, N.-W. Provinces, Bengal, Madras, and Burma. The total number of appointments therefore in the Jail service, which are usually held by I. M. S. men, is 33.

There are thus 3 grades, and the numbers of men in these grades are 4, 25, 5. If we take the average service of a man in the I. M. S. as 25 years, and if the average time spent in the Military Department before entering the Jail Department be taken as 4 years, the average service in the Jail Department would be 21 years. The proportion of service spent in each grade would be roughly as follows:—

2nd class	4/33, i.e., approximately 1/8th.
1st class	24/33 do. do. 4/11th.
Inspector-General's grade	6/33 do. do. 1/5th.

3. Taking the average service in the Jail Department as 21 years, and calculating according to the above proportion, we find that the periods a man may expect to serve in the various grades would be as follows:—

In 2nd class	3 years.
In 1st class	15 "
In Inspector-General's grade ...	3 "

Total ... 21 years.

4. *Inducements to enter the Jail Service.*—The Government have from time to time offered inducements to officers of the Indian Medical Service with a view to making the Jail service more popular with them. These inducements are as follows:—

- permission to do private practice;
- increased pay after 18 years' service in the Jail Department;
- appointments as Inspector-General of Jails in some Provinces.

These will be considered in the above order.

(a) *Private practice.*—The Central Jails are usually situated some distance from the cities, and however willing a man may be to take private practice, it is practically impossible for him to get any practice.

(b) *Increased pay.*—The Government of India have approved of an increase of pay to the Superintendents of 1st class Jails after 18 years' service in the Jail Department. The Jail Committee of 1889 had recommended that the increased rate of pay should be given after 18 years' service under Government, and the N.-W. P. Government were in favour of that proposal (see No. 346 from Secretary to Government of India to Secretary to Government of N.-W. P., dated 20th June 1892). But the Government of India decided that the increased rate of pay should be given after 18 years' service in the Jail Department. According to the calculation already made, an I. M. S. man may expect to rise to the position of Inspector-General after 18 years' service in the department or about 22 years' total service, so that this increase of pay comes at a time when he may ordinarily expect to be promoted to the office of Inspector-General. The advantage afforded by this increase of pay will only on very rare occasions be experienced.

(c) *Promotion.*—In Bengal, Madras, Punjab, N.-W. Provinces and in Burma, the office of Inspector-General is usually given to an I. M. S. man. In Bombay, Central Provinces, and Berar, the office of Inspector-General is combined with other duties, and it is impossible to reserve it for I. M. S. (See page 5, Extract from Government of India Proceedings, Home Department, dated Simla, the 9th November 1892.) This is the only real incentive to men to enter the Jail Department, but this only affects men in certain Provinces. The position of men in smaller Provinces will be dealt with in the next paragraph.

5. *Prospects of Superintendents in the smaller Provinces.*—In the Government Resolution quoted below it will be seen that the Government of India wished to hold out to Superintendents of Central Jails the prospect of becoming Inspector-Generals, but while this rule gives 24 out of 26 of the Superintendents of 1st class Central Jails a reasonable chance of obtaining the appointment of Inspector-General it makes the promotion of the other two—the Superintendents of Yerrowda and Nagpur—depend on the incompetence of all the Superintendents in one of the other Provinces. Under the present orders, therefore, appointments to one of these two Central Jails (Nagpur and Yerrowda) would imply annihilation of all prospects of rising to the position of Inspector-General.

6. *Difficulty in recruiting men for the Jail Department.*—Some difficulty has been experienced in getting good men of the I. M. S. Service to join the Jail Department, and there is little doubt that it is the most unpopular of all the branches of the Indian Medical Service. A rule was made some time ago providing that if an I. M. S. man once entered the Jail service he would be bound to continue in it for the rest of his service. It has recently been proposed to relax that rule and allow a man to remain in the department for two years before giving his final decision as to whether he will stay in the department permanently. There are two ways of inducing men to remain in a particular branch of a service—one by offering better pay and prospects, the other by what has been called the "rat-trap" method, that is, by binding a man to stay in the Department when he has once entered it. The "rat-trap" method in any shape or form is bad, and from the nature of the work there is no service in which such a method is more objectionable than in the Jail service. Any attempt which are made with a view to making the service more popular ought to be in the direction of increasing the pay and prospects.

7. As a rule, men in any service prefer to serve under men who belong to their own rather than to men who belong to other services. An I. M. S. man serving in the Central Provinces has had as his Inspector-General a Military Civilian, an Uncovenanted Civilian, a Police man, and an I. C. S. man. This fact must have a certain amount of influence in preventing I. M. S. men from entering the Jail Department in the smaller Provinces, or from entering the Jail service at all, knowing that they may be sent to one of the smaller Provinces.

8. *Effect of recent alterations on the conditions of service as regards I. M. S. men in the smaller Provinces.*—Both Nagpur and Yerrowda Jails are far away from the cities, and so the privilege of carrying on private practice confers little benefit. The increased rate of pay to Rs. 1,200 comes at a time when the Superintendents of these Jails would probably be thinking of retiring. The Government of India Resolution referred to above, while expressing the intention of holding out the prospect of succeeding as a general rule to the Inspector-Generalship, at the same time practically removes all hope of obtaining such appointments from the Superintendents of the two Jails named above (Nagpur and Yerrowda). They may be appointed in another Province, if the Local Government has no suitable officer. The Governor-General in Council considers it "expedient to hold out to the Service the prospect of succeeding as a rule to the Inspector-Generalship," but by the latter clause of the rule this would only apply to the Superintendents of these two Jails in very exceptional circumstances or in circumstances which would not be likely to occur.

The Superintendent of the Nagpur Central Jail was formerly able to revert to the ordinary Civil line, and if this privilege is discontinued while at the same time he is practically debarred from the hope of advancement in the Jail Department, the new rules bear specially hard on the officer of the I. M. S. who is Superintendent of the Nagpur Jail, and who came into the Jail Department before the new rules were issued. It is hoped, therefore, that the privilege of again joining the Civil line when an opportunity offers may be conceded to him.

THE INDIAN MEDICAL SERVICE.

THE Governor-General in Council is pleased to direct the substitution of the following for paragraphs 2, 3 and 4 of Home Department Medical Notification No. 361, dated the 30th July, 1886, regarding the Administrative Staff of the Indian Medical Service in the several Provinces in India.

2. The Administrative appointments are the following :

	Monthly salary. Rs.
1 Director-General of the Indian Medical Service and Sanitary Commissioner with the Government of India	2,700
1 Secretary to the Director-General of the Indian Medical Service and Sanitary Commissioner with the Government of India, Rs. 1,200 rising to	1,400
1 Surgeon-General with the Government of Madras	2,500
1 Personal Assistant to Surgeon-General with the Government of Madras (consolidated)	600
1 Surgeon-General with the Government of Bombay	2,500
1 Personal Assistant to Surgeon-General with the Government of Bombay (consolidated)	600
1 Colonel with title of Inspector-General of Civil Hospitals, Bengal	2,250
1 Colonel with title of Inspector-General of Civil Hospitals for the North-Western Provinces and Oudh	2,250
1 Colonel with title of Inspector-General of Civil Hospitals for the Punjab	2,000
1 Colonel with title of Inspector-General of Civil Hospitals and Sanitary Commissioner for Burma	2,000
1 Colonel for Civil Medical Administration in the Central Provinces	1,800

3. The Director-General of the Indian Medical Service will be the head of the amalgamated Indian Medical Services in India. It will be his duty, among other matters, to propose transfers between the Military and Civil Departments, to recommend for promotion to the administrative grades, and to advise the Government on all questions relating to the admission of officers and subordinates to the Indian Medical Service, to the conduct and services of Indian Medical Officers of all grades, and to the supply of medical and surgical stores. The Director-General of the Indian Medical Service and Sanitary Commissioner with the Government of India will be entitled to receive any information he desires from the Surgeon-Generals of Civil Hospitals, Administrative Medical Officers and Sanitary Commissioners attached to the Local Governments and Administrations, and to communicate with these officers in regard to the operation of departmental rules and orders; but he will exercise no direct authority over these officers, who will be solely under the orders of the Local Government or Administration to which each belongs.

4. Officers will be selected for the abovenamed administrative offices by the Government of India for the Bengal Presidency and by the Governments of Madras and Bombay for those Presidencies respectively. Selections will be made in each Presidency from the whole Indian Medical Service of that Presidency, and the principles of selection hitherto followed in all other respects in making such appointments will be observed. The nominations by the Governments of Madras and Bombay respectively will, however, be subject to the approval of the Government of India.

The Surgeon-Generals with the Governments of Madras and Bombay will be restricted to the exercise of the functions of Administrative Medical Officers and Civil Inspector-Generals of Hospitals in respect to the Civil Medical Staff and Civil Medical Institutions in their respective presidencies. They will exercise no control over those sections of the existing medical establishments of Madras and Bombay which are composed of officers employed with the army or over the reserve of 25 per cent. for leave and casualties, the administration of which will be conducted directly under the orders of the Government of India.

THE services of Lieutenant-Colonel J. S. WILKINS, D.S.O., I.M.S., are placed at the disposal of the Military Department. He has been for some time Special Plague Medical Officer, Bombay.

SURGEON-GENERAL W. A. CATHERWOOD, R.A.M.C., and Lieutenant-Colonel W. JOHNSTON, R.A.M.C., have gone home on medical certificate.

LIEUTENANT-COLONEL T. S. WEIR, I.M.S. (Bombay), has been promoted to Colonel, and posted to Quetta as P. M. O.

WE presume that as two new Regiments (the 41st Dogra and 46th Punjab) are being raised, a corresponding increase in the cadre of the I.M.S. is contemplated.

CAPTAIN C. T. HUDSON, I.M.S. (Bombay), has joined the Mint Department, with effect from 17th September 1900.

LIEUTENANT-COLONEL J. MITTLAND, I.M.S., remains on medical certificate leave in England till end of the year.

MAJOR F. D. C. HAWKINS, I.M.S., was posted to Ghazipur, and Major J. MORWOOD, I.M.S., as Civil Surgeon to Azamgarh.

THE following promotions are gazetted :—

BENGAL.

Majors to be Lieutenant-Colonels, I.M.S.

George Michael James Giles, M.B.; Arthur Robert Wyatt Sedgfield, M.B.; Edwin Francis Horatio Dobson, M.B.; Johnston Shearer, M.B., D.S.O.; Hem Chandra Banerji, Shambhu Chandra Nandi, M.B.; Francis Samuel Peck.

Captains to be Majors, I.M.S.

Herbert Edward Drake-Brockman, William Byam Lane, Philip James Lumsden.

MADRAS.

Majors to be Lieutenant-Colonels, I.M.S.

John Lawrence Van Geyzel, M.B.; Hastings Norman Victor Harington; Gerard Macklin Eccles McKee; Kavasji Cursetji Sanjana; Hormasji Merwanji Hakim; John Adolphus Burton; Francis Joseph Doyle; Manekshaw Jamshedji Kelawala; Merwanji Pestanji Kharegat.

BOMBAY.

Majors to be Lieutenant-Colonels, I.M.S.

Kavasji Hormasji Mistri; George Ernest Fooks; Joseph William Townsend Anderson.

MAJOR CLARKSON, is appointed Civil Surgeon of Arrah.

DR. A. W. REID has been taken into temporary employ in Bengal.

OF the 57 I. M. S. officers in civil employ in Madras, 17 have been withdrawn temporarily from Civil to Military duty.

CAPTAIN C. H. WATSON, I.M.S., is appointed as Civil Surgeon of Hoshangabad, C.P.

LIEUTENANT-COLONEL C. F. WILLIS, M.D., I.M.S., Superintendent of Mahabaleswar, is granted the powers of a Magistrate, within the limits of that Hill Station.

LIEUTENANT-COLONEL W. H. HENDERSON, I.M.S., F.R.C.S.I., is appointed Civil Surgeon of Poona, vice Lieutenant-Colonel J. P. Greay, I.M.S., granted leave for six months (m.c.). Major W. H. Burke, I.M.S., succeeds Lieutenant-Colonel Henderson as Surgeon to the Gokuldas Tejpal Hospital, Bombay, and Captain Ashton Street, I.M.S., succeeds Major Burke in Kathiawar Agency.

CAPTAIN J. W. T. ANDERSON, I.M.S., is posted as Civil Surgeon of Aden.

MAJOR P. W. O'GORMAN, I.M.S. (on being relieved by Lieutenant-Colonel Dobson, I.M.S., as Medical Storekeeper, Mian Mir), joins the Civil Medical Department of the Punjab, and is posted as Civil Surgeon of Jhang.

LIEUTENANT-COLONEL H. D. COOK, I.M.S. (Madras), retires from the service. He is an M.B., C.M. of Edinburgh (1869).

MAJOR W. VOST, I.M.S., on recall from furlough, was posted as Civil Surgeon to Jaunpur, N.-W. P.

LIEUTENANT E. W. COSTELLO, I.S.C., who has recently been invalided from China, having been shot through the foot in the relief of Pekin, is a son of Surgeon-Colonel C. P. Costello, I.M.S., who a few years ago was Administrative Medical Officer in Assam. Lieutenant Costello won his V.C. on the North-West Frontier, where he was twice dangerously wounded, in 1897.

CAPTAIN A. F. STEVENS, I.M.S., recalled from the Civil Surgeoncy of Arrah to military duty, is attached to No. 4 General Hospital, Calcutta, which is prepared to receive the invalids from China.

WE understand that Major TUDHY, I.M.S., recently a Civil Surgeon in the N.-W. Provinces and Oudh, has set up in practice at West Hove, Brighton.

ON being relieved of his appointment as Sanitary Commissioner, N.-W. Provinces and Oudh, Major G. M. Giles, I.M.S., becomes Civil Surgeon of Saharanpur, Lieutenant-Colonel Thompson, I.M.S., C.I.E., having rejoined from furlough.

CAPTAIN W. G. P. ALPIN, I.M.S., on recall from furlough, was posted as Civil Surgeon of Mirzapore.

MAJOR J. H. T. WALSH, I.M.S., who has been, for the past two years, acting Civil Surgeon of Murshidabad, has been confirmed in that desirable appointment, and Captain B. H. Deare, I.M.S., is confirmed as Civil Surgeon of Midnapur.

MAJOR DRURY, I.M.S., Professor of Pathology, Medical College, Calcutta, and Captain L. Rogers, I.M.S., now Deputy Sanitary Commissioner, Bengal, are engaged in an examination of the connection between jute and tetanus.

CAPTAIN B. H. OLDHAM, I.M.S., of the Presidency General Hospital, Calcutta, has returned from sick leave in England.

LIEUTENANT-COLONEL W. A. SIMMONDS, I.M.S., and Captain H. Bennett, I.M.S., also return to India from leave.

ON being recalled from furlough, Lieutenant-Colonel C. W. P. Dennys, I.M.S., becomes Civil Surgeon of Peshawar.

CAPTAIN J. STEVENSON, I.M.S., who has been acting as Civil Surgeon of Peshawar, is transferred to Bannu.

MAJOR J. GARVIE, I.M.S., takes over the civil medical duties of Dera Ismail Khan.

LIEUTENANT-COLONEL B. DOYLE, I.M.S., on return from furlough, is posted to Karnal as Civil Surgeon.

MAJOR A. COLEMAN, I.M.S., recalled from leave, goes to Gujrat as Civil Surgeon.

MAJOR BRAIDE, I.M.S., returns from furlough to his appointment as Superintendent of the Central Jail, Lahore, and Captain Heard, I.M.S., who was acting for him, becomes Civil Surgeon of Dalhousie.

HONORARY LIEUTENANT G. O. FORREST, Senior Assistant-Surgeon, I.S.M.D. retires from the service.

CAPTAIN E. E. WATERS, I.M.S., Superintendent, Presidency Jail, Calcutta, who was recalled to military duty in July last, has recovered from an attack of enteric fever and has got six months' leave (m.c.) to England.

THE services of Captain P. F. Chapman, I.M.S., M.B., are placed permanently at the disposal of the Government of the Central Provinces.

A SOUTHERN INDIA newspaper states that Lieutenant-Colonel E. Lawrie, I.M.S., is to get an extension of service for one year, on attaining the age of 55 years. Lieutenant-Colonel Lawrie completed 28 years' service on 30th March 1900.

SURGEON-GENERALS R. HARVEY and L. P. Spencer completed their 35 years' service on 31st March 1900. Colonels Hutcheson, Franklin, Davis, Hendley and Carr Calthrop have completed their 30 years' service. The next three officers on the Bengal list are dated from March, 1872, viz., Colonels Scott-Reid, Joubert and Bookey.

ON the Bombay service Colonel S. O'B. Banks, I.M.S., has the longest service, and in Madras Colonel T. J. McGann.

THE names of the following officers appear in the Army List in italics, i.e., they do not count in the regular list of cadre appointments in the Indian Medical Service, viz.—

Lieutenant-Colonel G. Ranking, Secretary to Board of Examiners; Major A. S. Alcock, I.M.S., Superintendent, Indian Museum; Major W. Rice Edwards, on field service on Lord Roberts' Staff; Major W. H. Elliot, who has been through the siege of Ladysmith with the Indian Field Hospital; as also Captain G. H. Frost; next Captain J. B. Haig is absent with the Uganda Regiment; Captain C. E. Williams is Health Officer to Rangoon; Captain Lamb is at the Research Laboratory, Bombay. In the Madras service we find Major W. B. Bannerman in charge of the Plague Laboratory, Bombay; and Captain J. W. Cornwall is Health Officer, Madras; Captain D. E. Jennings, I.M.S., is put down as on special duty under the Sanitary Commissioner, Bombay; Captain B. H. F. Leumann, I.M.S., has been on special plague duty in Natal; Captain S. Evans has been Assistant Health Officer, Port of Bombay; and Lieutenant J. T. Gage was till recently Curator of the Herbarium at the Calcutta Botanical Gardens.

OF the eighteen men who joined the I. M. S. with Commissions dated 28th June 1900, five are posted to Bengal Command, four to Punjab, five to Bombay and four to Madras.

THERAPEUTIC NOTES AND PREPARATIONS.

WE again direct attention to Messrs. **Burroughs, Wellcome & Co.'s** **Tabloids** of Methyl Violet (gr. 1) and to their most convenient tabloids containing Bismuth, Soda and Rhubarb.

ATTENTION is directed to the **Litholapaxy instruments** advertised by **Weiss**. Our Stone number bore testimony to the excellence of the instruments made by this firm. They now have brought out the modification of the **Giant Lithotrite** introduced by Captain Henry Smith, with a spare blade made with a single row of cutters.

Notice.

SCIENTIFIC Articles and Notes of Interest to the Profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if requested.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., Calcutta.

Annual Subscriptions to the *Indian Medical Gazette* Rs. 12, including postage.

BOOKS, REPORTS, &c., RECEIVED.

Hernia, by W. McAdam Eccles. Balliere, Tindall and Cox.
Diseases of Nose and Throat, by McBride. Young J. Pentland.
Physiology, Vol. II, by British Authors. Young J. Pentland.
The Burma Hospitals' Report.
The Bombay Hospitals' Report.
The Bombay Asylums' Report.
The Bengal Veterinary Report.
The Director-General's Annual Note on Jails.
Transactions of Bombay Medical Society.

COMMUNICATIONS RECEIVED FROM:—

Lieut.-Col. R. Macrae, I.M.S., Dacca; Lieut.-Col. G. M. Giles, I.M.S., Saharanpur; Major E. Roberts, I.M.S., Simla; Capt. Rost, I.M.S., Meiktila; Dr. O. W. Jones, Yeotmal; Capt. C. Barry, I.M.S., Rangoon; Dr. Copplestone, Duars; Major Cunningham, I.M.S., Delhi; Capt. Henry Smith, I.M.S., Jullundur; Revd. G. Crosier, M.D., Silehar; Capt. G. Lamb, I.M.S., Bombay; Dr. K. N. Das, Calcutta; Major F. P. Maynard, I.M.S., London; Dr. D. F. Keegan, Weisbaden; Dr. C. B. Bailliere, London; Mr. H. Keith, London; Editor, "F"; Mr. H. Milton, Cairo; Major A. Fullerton, I.M.S., Agra; Mr. Haffkine, Bombay; Major A. Buchanan, I.M.S., Nagpur; Lt.-Col. O'Connell, R.A.M.C., Peshawar; Capt. J. G. McNaught, R.A.M.C., Deolali; Capt. L. Rogers, I.M.S., Calcutta; Major H. Brown, I.M.S., Calcutta; Major D. G. Crawford, I.M.S., Hooghly; Capt. O'G. Lalor, I.M.S., Hongkong; Capt. Walton, I.M.S., Peking.

